VETERINARY MEDICINE

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Report of the 58th Annual Meeting, United States Livestock Sanitary Association (Abstracts and notes of papers and committee reports)

Field Use of an Adsorbed Swine Erysipelas Bacterin

Clinical Aspects of Canine Nephritis

Cystitis and Urolithiasis

Clinical Use of Neomycin-Hydrocortisone Ointment in Dogs and Cats

Review of Progress in Veterinary Medicine 1954

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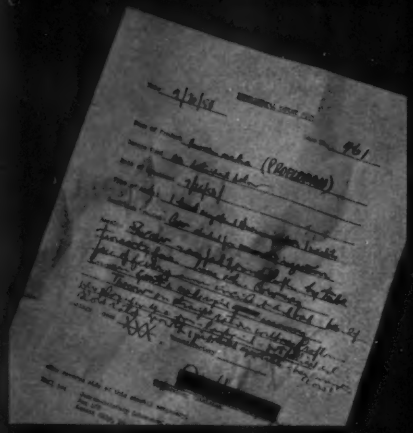

case report 461 | toxic indigestion
(ingestion of placenta)

A practitioner in Southern Ohio sends us this case report involving use of PROFLORAN in treatment of toxic indigestion in a valuable dairy cow. On arrival at client's farm, he was told that the patient had calved recently, and had eaten the placenta. The animal's temperature was now 107°. She had not eaten for several days and her condition was generally quite toxic.

Immediately, the practitioner administered rumen stimulants plus two pounds of PROFLORAN rumen media in water by stomach tube. Within 24 hours, cow ate and drank normally and soon recovered completely. This practitioner has since used PROFLORAN in similar cases with comparable results.

why PROFLORAN therapy is successful when rumen transplants fail

PROFLORAN therapy has been strikingly *successful where rumen transplants have failed.* WHY?

The answer is simple: when rumen function is impaired, conditions within the rumen are unfavorable for growth and reproduction of the normal microflora. Unless something has been done to improve the environment within the rumen, transplants of either fresh or preserved organisms will fail (or be only partially effective).

Now PROFLORAN, a highly concentrated microfloral food, provides two things: *alkaline salts* to serve as a buffer and substitute for the lack of salivary flow; and a *nutrient media* in which normal gram-negative organisms can develop and grow.

Introduced into the rumen by stomach tube, PROFLORAN *reduces the acidity* of the fermenting contents, making possible the regeneration of normal bacteria *without transplants* . . . and *provides essential nutrients* for increased bacterial growth and reproduction.

Hundreds of practitioners have now substantiated the PROFLORAN principle.

PROFLORAN is supplied in 2 pound jars, boxes of six. One jar, mixed with water and given by stomach tube or on feed, has proved effective in most cases. Try PROFLORAN soon.

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Forestry Farmer

Report Of The Fifty-Eighth Annual Meeting, U. S. Livestock Sanitary Association, Omaha, Nebraska

The United States Livestock Sanitary Association dates its meetings from that held in Ft. Worth, Texas in September 1897. This meeting, as is well known, resulted from an invitation of the operators of the Ft. Worth Stock Yards to state veterinarians of the northern states to come to Ft. Worth to observe a new method reputed to free cattle of disease-bearing ticks.

During the preceding summer, the Yards at Ft. Worth built a large dipping vat and placed it at the disposal of the U. S. Bureau of Animal Industry for test purposes. Experiments planned for the King Ranch in Nueces County, Texas were transferred to Ft. Worth for convenience. It is thus that the history of the U.S.L.S.A. is intimately associated with eradication of "tick", or "Texas" fever.

It has been understood, rather generally, that the parent organization known as the Interstate Association of Livestock Sanitary Boards was formed at the Ft. Worth meeting. However, a brief review of the history of the Association (Proceedings of the U.S.L.S.A. 54th Annual Meeting, Phoenix, Arizona) states that organization of livestock officials of various states preceeded that date. Cited is a reproduction of a resolution adopted at the Interstate Meeting of Livestock Boards and State Veterinarians in 1891, that pertains to bovine tuberculosis.

The work of Drs. D. E. Salmon, Theobald Smith, Cooper Custice, and F. L. Kilbourne gained world attention immediately prior to 1897 and confirmed the suspicion of southern cattlemen that ticks on their cattle somehow were connected with the spread of disease. Subsequent proof that it was safe to drive tick-free cattle north established the industry in that portion of the country particularly suited to it.

Many serious disease threats, occurring during the past half century, have since been eradicated or brought under practical control by cooperative efforts of state officials through this organization. Now, as always, new disease entities are continuously revealed which pose threat and hazard to the industry and the nation's meat supply. Active cooperation of all segments represented in this Association give increasing assurances that disease ravages will be held to a minimum.

Dr. H. F. Wilkins, State Veterinarian, Helena, Montana, was named as new President of the United States Livestock Sanitary Association.

President's Address

Dr. T. C. Green, state veterinarian, Charleston, West Virginia, the retiring president at this convention, sounded the note for closer cooperation between states by recommending that serious consideration be given the subject of minimum health requirements governing interstate movement of all livestock. "Our livestock," he stated, "is one of our greatest civil defense weapons, and we are challenged collectively and individually to keep it healthy."

He called attention to the potential of isolated foci of bovine tuberculosis infection. He stated that it was his opinion that the incidence of this disease is actually on the increase. To accept the statement that bovine tuberculosis is no longer a major disease threat may be a dangerous and false assumption, particularly when such statement is based on facts accumulated from evidence supplied by spot testing. He questioned results of routine testing because of the discrepancy in reactor rate as determined by the tuberculin test compared with that observed at slaughtering establish-

ments. Ceaseless care and attention to technics of the tuberculin test were recommended. Aggresssive efforts to disclose sources of infection were emphasized also.

New Officers

Unanimous action was taken on the recommendations of the Nominating Committee for new officers to serve the Association for the coming year. Elected and installed were: Dr. H. F. Wilkins, Helena, Montana, president; Dr. A. L. Brueckner, Baltimore, Maryland, 1st

Dr. Ralph A. Hendershott, Chief of the Bureau of Animal Industry of New Jersey, succeeded himself as Secretary-Treasurer.

vice-president; Dr. G. H. Good, Cheyenne, Wyoming, 2nd vice-president; and Dr. John G. Milligan, Montgomery, Alabama, 3rd vice-president. Dr. Ralph A. Hendershott, Trenton, New Jersey was selected by the Executive Committee for the twelfth consecutive year to serve as secretary-treasurer.

It was announced at this meeting that the 1955 convention will be held in New Orleans, La. The Jung Hotel has been selected tentatively as headquarters; dates will be announced later.

The 1954 Annual Report

The quotations, abstracts, notes and excerpts appearing on the succeeding pages of this issue of VETERINARY MEDICINE represent this reporter's interpretation of opinions expressed by speakers. It is not an abridgement, nor has there been an attempt to do other than cover briefly a few of the high points of this three-day session. The full text of discussions presented by national authorities on a long list of old and new diseases of livestock, together with full proceedings of the august deliberations of this body of state disease control officials will be made available to all members shortly after the turn of the new year. These will appear, as usual, in the form of a Proceedings Book. Both classes of members (official and individual) will receive a copy of this report as soon as published without additional expense over cost of annual membership dues of $3. It has been repeated frequently that in no other veterinary publication during the year is so much valuable information made available at so little cost. Veterinarians in all lines of professional activity, and especially practitioners, are urged to take advantage of the opportunity for individual membership if for no other reason than to avail themselves of the Proceedings.

For further information, application blanks, et cetera, write Dr. Ralph A. Hendershott, secretary-treasurer, 33 Oak Lane, Trenton, New Jersey.

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HOG CHOLERA ERADICATION: A REPORT ON THE FLORIDA PILOT TEST PROJECT

Notes taken from address by C. L. Campbell, D.V.M., Florida State Veterinarian, Tallahassee.

Since hog cholera made its first appearance in southern Ohio in 1833, it has destroyed more hogs than all other swine diseases combined, causing losses in some years of nearly $65,000,000. Now, it can be stated rather definitely that after over 100 year's experience, and expenditures of great sums, eradication appears possible and practical.

The Association's Florida Pilot Test Project, developed through recommendation of its Committee, was launched in two selected counties. Announcements and meetings were held to acquaint farmers with the project and its objectives. Definite conclusions can not be drawn at this time, but preliminary results are interesting. Of the estimated 70,000 to 85,000 hogs in the two-county area, 50,000 were vaccinated in 1953. Possibly 5% of these received modified live virus, the remainder serum and simultaneous virus. Reported outbreaks during this period involved approximately 130 herds. Since July 1, 1954, 16,300 swine have been vaccinated, over 9,000 receiving modified virus by choice of owners. In the subsequent four months (July 1 to October 31), only one case of cholera has been reported from the area. This occurred in a non-vaccinated herd. Farmers are crediting the program and are expected to enter into the second phase of the project enthusiastically.

LIVESTOCK REGULATORY PROGRAMS

Notes from a paper presented by C. D. Van Houweling, D.V.M., Director, Livestock Regulatory Programs, Agricultural Research Service, USDA, Washington, D. C.

Reorganization of the United States Department of Agriculture under the leadership of Secretary Benson, which took effect on January 1, 1954, has broadened the base of administrative responsibility of federal veterinary services. The significant change throughout the Department begins in the Secretary's office where each assistant is given the dual responsibility of staff member and as operations head of agencies in the group assigned. The activities identified with the old BAI for almost 70 years, were placed in two administrative units, *i.e.* (1) Livestock Research and (2) Livestock Regulatory Programs. Both of these became a part of the new Agricultural Research Service formed by a merger of the BAI and several other research bureaus. Lines of authority and personnel, at present assigned, of various sections of the new organization are illustrated in the accompanying charts.

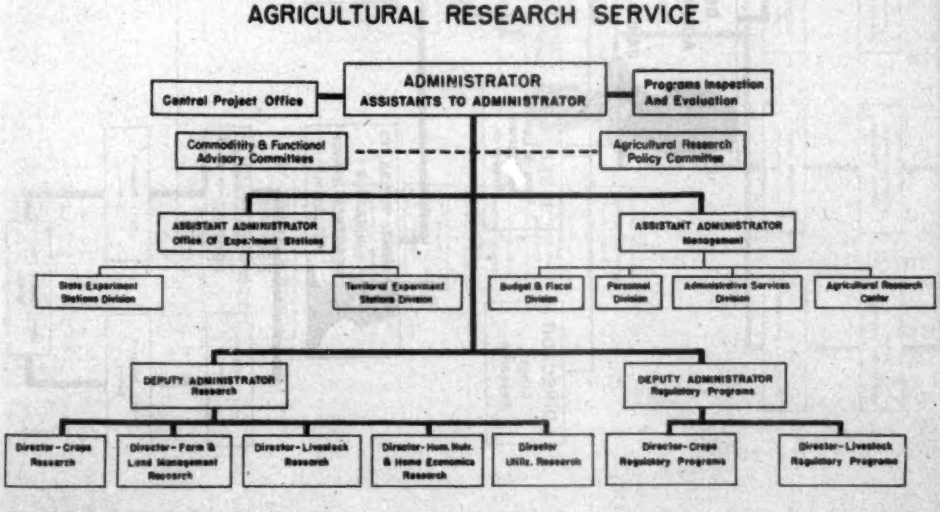
Professional strength measured by number now serving in federal regulatory work is smaller at this time than in any recent years. In October 1953, the force numbered 1,517, and 1,451 by the end of the fiscal year. There were 1,340 veterinarians on duty at the beginning of 1954, which has since been reduced to 1,300. Any further decline is likely to be embarrassing. Present strength must be expanded to carry out responsibilities assigned.

Doctor Van Houweling referred to cooperation of federal agencies with others and with practicing veterinarians. He stated that reorganization of the service facilitated this cooperation. A new type of cooperation has been initiated in South Carolina and Wisconsin. In each of these states, one man has been placed in charge of both state and federal livestock regulatory programs. It is anticipated that this organization experiment will be given a thorough trial in the hope it may prove to have advantages over the system existing in most states.

In reference to activities for 1954 on the disease front, the speaker expressed high hopes that the second outbreak of foot-and-mouth disease in Mexico would become history by December 31, 1954, at which time the United States-Mexican border will be opened for movement of meat and meat products, unless unforseen infection recurs.

Referring to vesicular exanthema among swine, it was noted that 111 separate occurrences were reported during the first two months of 1954 in 15 states. Ninety-one of these occurred in four states and of these 76 were reported in two states that have not passed garbage cooking legislation, and eight in one with an inadequate law. Mention was made of the effectiveness of the technic of restricting market contained in the California regulation, which has served to decrease incidence of vesicular exanthema in that state.

Tuberculin testing of cows continues. Approximately 10,000,000 tests will be reported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Personnel Division
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DEPUTY ADMINISTRATOR Regulatory Programs
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Director Utiliz. Research
Director - Crops Regulatory Programs
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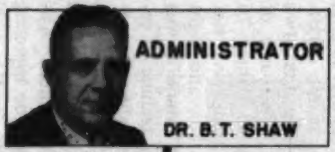

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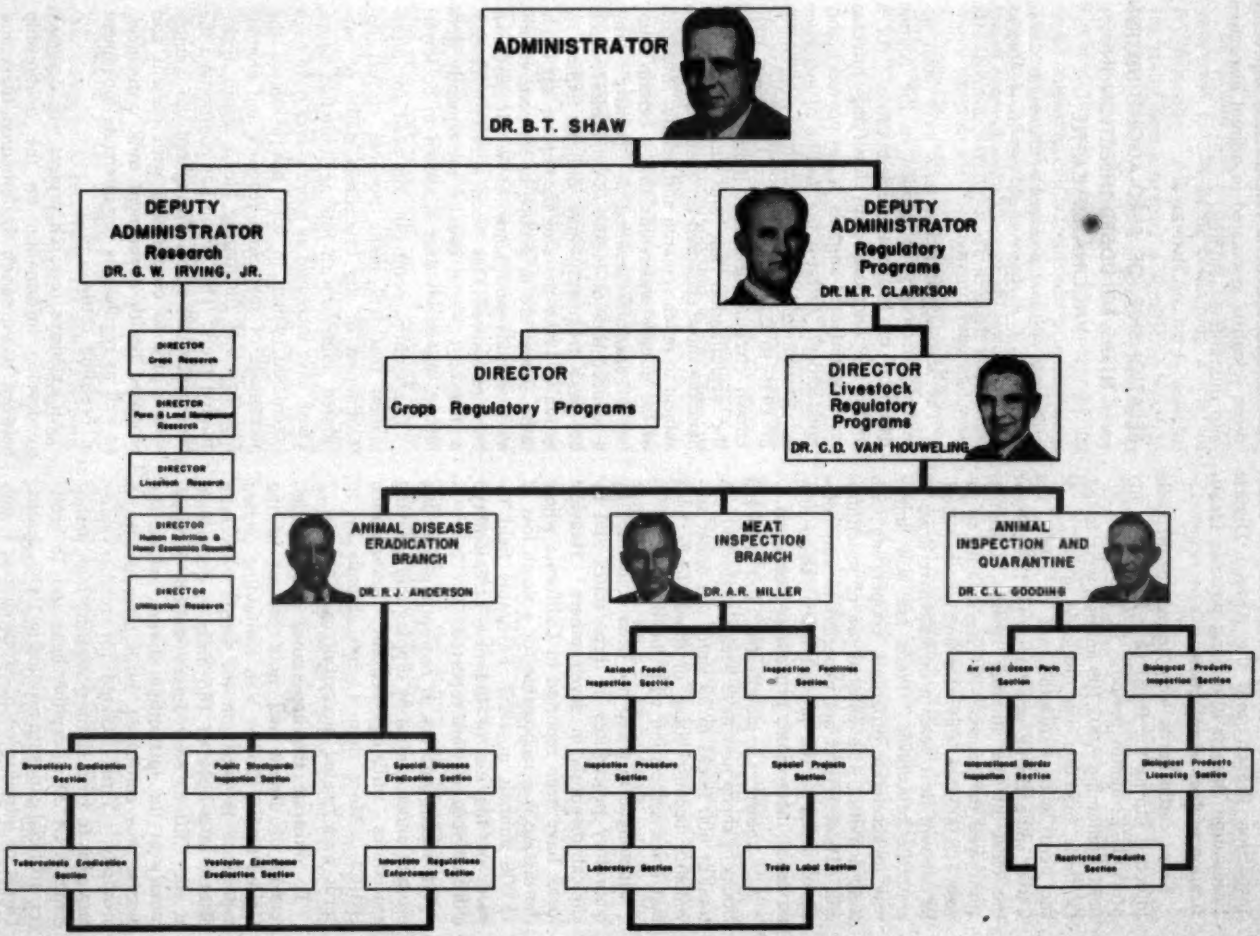
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Trade Label Section
Air and Ocean Ports Section
International Border Inspection Section
Restricted Products Section
Biological Products Inspection Section
Biological Products Licensing Section

this year with reactor rate not expected to change from the 0.11% reported for the previous three years. Cooperation of the Meat Inspection Branch with the Animal Disease Eradication Branch is making possible identification of foci of infection.

More cattle herds were tested for Brucella infection during the fiscal year 1954 than any previous 12-month period. In 1954, 696,207 herds containing 9,002,109 animals were tested. Of these, infection was disclosed in 14.2% of the herds with a reactor rate of 2.6%, the lowest since testing was begun in 1934. Near the close of the summer session, Congress authorized the Secretary of Agriculture to invest $15,000,000. this year and another similar amount next year in an extensive drive to eradicate brucellosis. Plans are now under way to accelerate programs, cooperating with state activities with enlisted aid of practitioners. These efforts are expected to add additional states to the present list of three now modified, accredited, brucellosis-free areas.

All known scrapie-infected and exposed flocks of sheep now have been slaughtered. A total of 600 flocks in 39 states are under surveillance because sheep in those flocks have had some association with the disease.

Bluetongue in sheep has been confirmed by laboratory procedures in three states and by clinical diagnosis in seven others. Heaviest losses have been reported in California where the disease was responsible for a death loss of 15,000 animals in 1952. Favorable field reports on the use of the new chick-embryo cultured vaccine were reported.

The recent outbreak of psoroptic mange was brought under control by dipping and spraying procedures utilizing benzene hexachloride (BHC). More than 11,000 animals in 26 herds were treated successfully.

To illustrate the importance of early detection of disease not now present in the United States, Doctor Van Houweling recited experience in detection of Asiatic Newcastle disease in a flock of 166 birds in quarantine at the Clifton, New Jersey station. As customary at the quarantine station, where the disease was confirmed, birds were destroyed promptly. Virus isolated for further study proved it to be a strain possessing high pathogenicity. Of 20 susceptible hens and 28 broilers, artificial exposure resulted in 100% deaths. Threat of introduction of exotic disease is one the livestock industry must face squarely. A barrier conceived in the light of modern day conditions must be maintained and emergency measures prepared in the event some disease threat escapes detection. These are vital responsibilities of federal veterinarians, especially those scientists associated in animal inspection and quarantine activities.

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RELATIONSHIP OF SERO-AGGLUTINATION TITERS TO UDDER INFECTION IN VACCINATED CATTLE

Abstract of paper presented by Edwin R. Goode, Jr., D.V.M., T. E. Ameranet, B.S., and C. A. Manthei, D.V.M., Animal Disease and Parasite Research Branch, Agricultural Research Service, USDA, Beltsville, Md.

The sero-agglutination tests have been accepted universally as applied in the routine detection of Brucella-infected cattle. As a means of diagnosis for classifying infected from noninfected animals, it has proved highly satisfactory. Attest is the decline of incidence as determined by the blood test from 6.8% in 1936 to 2.6% in 1954. There are well-known circumstances that limit the value of the agglutination test and the problem of handling those classified as "suspects" has been subject to much research and debate. Students of the disease understand that a certain number of animals classified as "positive" show a reduced titer of 1:200. Furthermore, retest of these frequently may indicate either reaction in lower titers or incomplete agglutination. These are in groups of unbred, vaccinated animals and some cows. It also has been recognized that when a reactor reaches a titer of 1:300 it usually subsequently goes higher, and rarely ever is shown to be lower.

The authors point out the need for information that will make possible correct determination of the brucellosis status of vaccinated animals with low agglutination titers. These have increased as more calves have been vaccinated, which in turn has increased the percentage of suspicious reactors and animals with low and fluctuating blood serum agglutination titers. This group has confounded the herd brucellosis status throughout the country with regard to conforming with present and proposed health department milk ordinances, as well as regulations for interstate movement of breeding cattle.

An extensive research project was designed to develop information on the relationship between blood serum agglutination titers and udder infection in calf-vaccinated cattle. This was deemed to give a reliable and consistent means of identifying infected animals that were

excreting Brucella organisms in the milk.

The Experiment Procedures

Blood and milk samples were collected from 740 cows in 278 herds containing a total of 6,276 adults. All animals in herds selected for study demonstrating a significant reaction of 1:50 or higher were studied. These herds were located in New York state and in Jersey County, Illinois, which has been participating in an intensive calf vaccination program since 1942. Quarter samples of milk (or udder secretions of dry cows) were collected aseptically for culture and seriological study and blood samples for the standard tube and plate agglutination tests. Milk ring test (ABR) and whey agglutination studies also were conducted.

Results

Data collected strongly suggests that consideration must be given to liberalizing the blood agglutination test on properly vaccinated cattle if discrimination against these animals is to be eliminated and calf vaccination is to remain an integral portion of the adopted eradication program.

Percentage of demonstrable udder infection was two to four times greater in nonvaccinated than among those vaccinated as calves in all titer levels between incomplete (I) 1:50 and (I) 1:400. The author states that if it is logical to accept the 1:100 titer as the diagnostic level of infection in nonvaccinated cattle, it is equally logical to accept 1:200 as the diagnostic level of infection in those vaccinated with strain 19. The efficiency of this alternate interpretation in classifying calf-vaccinated animals is nearly identical to that of the present interpretation in classifying nonvaccinated cattle. This is based on the data which indicated that the most precipitous rise in percentage of udder infection began with the 1:100 titer in nonvaccinated and 1:200 in vaccinated animals. Furthermore, no isolation of *Brucella abortus* was made from milk of vaccinated cows showing agglutination in dilutions below 1:200.

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Reports of the efficacy of bluetongue vaccine have been received. Though favorable, they can not, as yet, be regarded as conclusive.

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Useful new knowledge on the influence of hormones is most likely to come from poultry research workshops.

CONTROL OF BRUCELLOSIS IN RANGE CATTLE

Notes from an address by Mr. F. S. Brenner, ranch owner and Chairman of the Montana State Advisory Committee on Brucellosis, Grant, Montana.

Experiences on the ranch owned by the speaker, with Brucella infection over a 25-year period, were related in a manner that should convince doubters of the value of eradication measures under range conditions.

Mr. Brenner pointed out that the western portion of Montana is cattle country and the crop is calves for market. He stated that a 45% calf crop, experienced prior to initiation of blood testing and calfhood vaccination, was not profitable. On this ranch an 80 to 90% annual calf crop is now realized, even under severe climatic conditions with only natural shelter available. This experience has provided opportunity to cull and improve herds.

He stated that management practices in his area make recommended vaccination at four to eight months impractical. He believes that liberalization of age of vaccination to 14 months would serve the purpose of brucellosis control in range cattle where heifers are segregated from sources of infection up to that age.

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U.S.L.S.A. Short Notes

Addition of bacterial cells enhances the growth-promoting properties of certain media employed for the culture of *Br. abortus—I. Forest Huddleson, D.V.M.*

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There appears little doubt as to the safety and efficiency of erysipelas bacterin for the immunization of swine and turkeys.

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Virtually all species of domestic animals seem to be benefited by the inclusion of antibiotics supplements in the ration.

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Only 15% of beef that comes to central marketing agencies is grain fed.

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Proper disposal of diseased poultry is essential to control efforts. Burning in properly constructed incineration units is preferred, though the pit system has proved satisfactory in many poultry producing establishments.

BLUETONGUE CONTROL IN RANGE SHEEP

Notes from paper presented by D. A. Price, D.V.M., Associate Veterinarian, Substation No. 14, Texas Agricultural Experiment Station, Sonora.

The history of bluetongue infection among sheep in the United States probably predates, by many years, its identification in California in 1952. Earlier, Hardy and Price, (*Jour. Am. Vet. Med. Assn.*, 120:23 [Jan.], 1952) described an affliction in Texas range sheep

Fig. 1. Common symptom of bluetongue is facial swelling. Note swollen muzzle and edematous ears on white-faced lamb.†

which they named "soremuzzle", and later positively identified it as bluetongue. Loss of appetite, diarrhea, rapidly developing emaciation, stiffness to extreme lameness, and lesions about the muzzle and mouth, including encrustation on the margins and at commissures of the lips, are confusing symptoms.

Fig. 2. Swollen muzzle and ears occur with equal frequency in white of black-faced lambs serving for differentiation of photosensitization. Above, mixed black-faced lamb from same flock as fig. 1.†

Laboratory confirmation of infection supports clinical diagnosis in Arizona, Colorado, California, and Texas. Clinical diagnoses not laboratory confirmed, have been made during recent months in Kansas, Missouri, Oklahoma, Nebraska, New Mexico, and Utah.

Vaccine Made Available

A method of immunization was developed in South Africa in 1906 and vaccination has been practiced in that country since. Now, an avianized quadrivalent vaccine is employed in that country which is claimed to afford adequate protection against all known virulent strains of virus. Ten strains have been isolated.

During the past two years, bluetongue vaccine, prepared by egg culture of a single virus isolated in California, has been made available for field use in the United States. Observations are continuing on extensive trials in the Southwest. Studies have indicated that all known isolates are immunologically similar or perhaps identical. There is some evidence, however, such as the appearance of distinct

Fig. 3. Frank ulceration on the dental pad and palate are associated with bluetongue in sheep (above). Note small ulcers on the anterior portion of hard palate.†

zones of coronitis that suggest the presence of antigenically dissimilar strains infecting animals in succession. Much has yet to be learned with regard to the optimum time for vaccination and the duration of immunity conferred.

Relationship of Bluetongue and Range Stiffness

Doctor Price pointed out the relationship of

†Photos courtesy Dr. Charles L. Davis, Animal Disease Research Laboratory, Animal Disease and Parasite Research Branch, Agriculture Research Service, USDA, Denver, Colorado.

"range stiffness", as it has existed in the Southwest for years, to bluetongue as a mild attack of the latter in three- to eight-month-old lambs. Range stiffness bears slight but significant, resemblance to bluetongue. Life-long immunity follows natural infection with bluetongue and, in the case of ewes, transient, immunity is conferred to suckling lambs. It is theorized that immunity thus acquired is sufficient to prevent frank bluetongue but not strong enough to prevent development of mild symptoms—stiffness. Neither do lambs acquire protective immunity, but are considered susceptible to massive infection. Research has shown that vaccination fails to protect young lambs, in which event the sheep industry may be expected to suffer annual economic loss unless additional control can be provided. Efforts in this connection have been toward control of activity of known vectors by frequent use of insecticidal sprays. Monthly or more frequent treatment is suggested to extend at least until lambs are seven to eight months of age, when vaccination may be expected to confer protective immunity.

Fig. 4. Hemorrhagic zones at the coronary band in a spring lamb. This lesion is common in acute cases exhibiting lameness.†

Fig. 5. Rear view of feet of same lamb shown in fig 4. The hemorrhagic zone extends into the softer portions of the feet. This lamb exhibited lameness or stiffness clinically. All four feet were affected.†

Culicoides midge (gnats) are known vectors of the disease and recent experimental evidence casts suspicion on certain mosquitoes. The latter studies need further investigation. Cattle were also suggested as possible carriers of infection. These facts make questionable value of quarantine measures as ordinarily applied.

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EQUINE ENCEPHALOMYELITIS IN PHEASANTS

Notes from paper by F. R. Beaudette, D.V.M., Preston Holden,† D.V.M., Dr. P.H., J. J. Black, D.V.M., J. A. Bivins, B.S., D.V.M., M.C., C. B. Hudson, B.S., M.S., and D. C. Tudor, B.S., V.M.D., New Brunswick, New Jersey.

A total of 29 outbreaks of eastern equine encephalomyelitis have been reported in pheasants in flocks in New Jersey, Pennsylvania, and New York, including five in 1952 and four in 1953 not previously reported. Each of these has been confirmed by accepted laboratory procedures.

Significant mortality has occurred in recent outbreaks and morbidity in affected groups has reached 90%. The theory of transmission by mosquitoes must be modified considering observations of field outbreaks. Birds of the same age, housed in contiguous pens, may escape disease for varying periods while adjacent pens suffer severe losses. Unknown mechanisms of transfer are possible.

The authors point out that the public health importance of equine encephalomyelitis is of such magnitude as to make advisable further research to elucidate epidemiology and practical control measures.

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Though studied for over 20 years, no satisfactory means of control of avian leucosis has been disclosed.

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Most recent observations give support to the suggestion that unthriftiness of swine exhibiting lesions of atrophic rhinitis is almost always associated with other diseases as concurrent infections. When no other lesions are present, negligible losses are reported indicating that changes in the turbinates alone are of little significance unless associated with pneumonia.

▾ ▾ ▾

†Communicable Disease Center, Public Health Service, U. S. Dept. Health, Education, and Welfare, Chamblee, Ga.

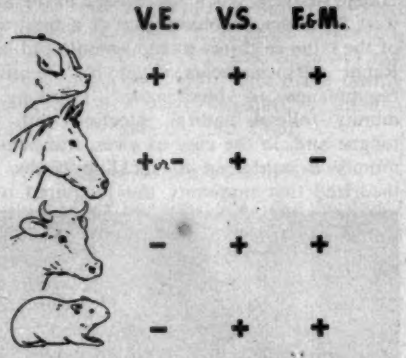
VESICULAR EXANTHEMA IN SWINE: VIREMIA STUDIES AND THEIR RELATIONSHIP TO VESICULATION

Notes from paper presented by W. C. Patterson, V.M.D., and J. R. Songer, B.A., Animal Disease and Parasite Research Branch, Agricultural Research Service, USDA, Beltsville, Md.

The questions arising in regard to presence of infective virus of vesicular exanthema in tissues of hogs, in relation to symptoms of vesicular exanthema, have been under investigation at the Beltsville station.

When the virus of vesicular exanthema is inoculated intradermally on the snout of a susceptible pig, vesicles develop at point of inoculation in about 24 hours. The reaction is accompanied by a rise in body temperature. Rupture occurs in about 48 to 72 hours following inoculation, after which secondary vesicles develop in distant body parts. Apparently virus multiplication occurs in the epithelium which is invaded at the injection site and is carried in the blood stream to all organs and tissue. If virus is injected intravenously, concentration of the viral agent occurs prior to vesiculation. Just where multiplication occurs in this instance has not been proved.

Significant findings support the theory of virus contamination in pork scraps. Meat scraps from infected pigs slaughtered up to and including seven days after intravenous inoculation produced lesions or immunity when fed to susceptible pigs and for five days after vesiculation. A period of viremia is noted in experimentally - exposed swine beginning about 48 hours prior to, and 36 hours after, vesiculation.



Differential diagnosis of vesicular diseases of livestock is based on test inoculatons in the four species illustrated above. Swine only are susceptible to all three virus diseases: vesicular exanthema (V.E.); vesicular stomatitis (V.S.); and foot-and-mouth disease (F. & M.).

Meat scraps from 14-day and one-month convalescent swine failed to infect susceptible test pigs by feeding.

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VESICULAR STOMATITIS IN SWINE

Abstract of paper presented by H. W. Schoening, V.M.D., Animal Disease and Parasite Branch, Agricultural Research Service, USDA, Beltsville, Md.

When vesicular exanthema escaped the confines of California over two years ago and raged across the country, the campaign of eradication that followed disclosed that vesicular stomatitis was rather extensive among swine in certain localities. Previously, this disease was not considered to be of especial concern be-

Vesicular exanthema in swine. Vesicle may be noted (circled) on foot at right. Raised area is whitened. Such areas may partially or completely encircle the hoof. Lesions after rupture of vesicles may be noted on both feet.

cause of its infrequent appearance among these animals. It has been considered primarily a disease of horses and cattle. Serological tests left no doubt that susceptibility of swine to all three vesicular diseases complicated, to some extent, differential diagnosis and raised the problem of proper control measures. Experience in some outbreaks in swine in open

Adapted from film—Vesicular Diseases in Animals

Vesicular stomatis. Note blanching in the region of the coronary band where a vesicle had formed. The slit-like opening at the upper margin of the blanched area indicates location of a vesicle just after rupture. All blanched skin could have been removed easily which would have exposed an angry, red surface.

range country also was confusing. It apparently was not always infectious for cattle on the same range. In Georgia, where extensive infection occurred, it was observed to affect cattle in only one instance.

Seriousness of vesicular stomatitis is that it needs to be differentiated from foot-and-mouth disease whenever its appearance is detected. Experimentally, swine are highly susceptible by both intravenous injection and scarification and spread has been observed by contact under naturally-occurring outbreak conditions. Questions in regard to reservoir host, such as wild rats and insect vectors need to be answered. Control measures await further deliberation and research on the unknowns.

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Magnitude of federal and state disease control work is not appreciated by the rank and file of the veterinary profession.

PLANS FOR ANIMAL MORTALITY AND MORBIDITY REPORTING

Notes from address by M. R. Clarkson, D.V.M., Deputy Administrator, Agriculture Research Service, USDA, Washington, D. C.

The U. S. Livestock Sanitary Association has recognized the need for, and has actively worked toward, establishment of a national reporting system almost continuously since its organization. A Committee on Mortality and Morbidity has functioned as a permanent study group with the Association which has cited the value to be gained by access to these vital statistics. These constitute important support in a sound structure of animal disease prevention, control, and eradication.

The speaker pointed out that as the intensity of population and interchange of commerce increases, the problem of disease control is multiplied. If number of animals double in a given area, it is reasonable that disease and pest problems increase four-fold. In this situation, access to statistical data becomes increasingly vital to control efforts.

In Britian, mortality and morbidity statistics are collected under authority of the Consolidated Diseases of Animals Act of 1894, and subsequent orders pertaining. The institution of these was at the insistence of animal owners who recognized their value. Without such cooperation laws promulgated would not be effective, nor would vital statistics be of value. Thirteen diseases were made notifiable by the British Act of 1894. Six of these have been eradicated and one has never breached quarantine. In addition, one other has disappeared. Lately, only six diseases are included on the fortnightly report. The National Veterinary Association collects vital information from its members on nonscheduled diseases.

Over the years, recommendations have been made by this association and other groups that disease reporting be undertaken by a federal government bureau. No funds have been appropriated for the work though requested frequently. Some details have been suggested, including lists of reportable disease, frequency of filing, distribution of information, and other matters. A start has been made and ten states are at present operating a disease reporting system utilizing report forms developed by the Communicable Disease Center of the U. S. Public Health Service. Several others are operating similar systems. Doctor Clarkson invited attention to many reports which are prepared and published at regular intervals in this field. Those now being con-

tinued include: (1) An annual report on the incidence of rabies, (2) a similar report concerning equine encephalomyelitis, (3) monthly summary on the incidence of anthrax, (4) antemortem and postmortem findings of the meat inspection service, (5) monthly and annual summaries on the incidence of brucellosis and tuberculosis in cattle, (6) annual summation of results of pullorum—fowl typhoid testing, (7) frequent reports of outbreaks of vesicular exanthema, scrapie, bluetongue, and (8) summaries of postmortem examinations of poultry. Taken all together the foregoing list is an imposing one though collection is not integrated or correlated efficiently.

Plans are proceeding from which action may be reasonably expected. A group is being established within the Agricultural Research Service to analyze and determine the need of federal participation from the standpoint of its responsibilities in protecting the nation's health. It is anticipated that the study planned will require approximately six months, and if discussions with various segments are favorable and cooperative, consideration will be given to including the project in the Department's budget.

At long last there is hope of establishing a unit within the USDA whose duties will be concerned exclusively with the serious task of collecting, coordinating, and reporting dependable mortality and morbidity data regularly.

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A comparison of two complement fixation technics for the diagnosis of bovine anaplasmosis was reported by Dr. D. W. Gates, Animal Disease and Parasite Research Branch, Agricultural Research Service. Aliquots of the same testing reagents, when used in the same relative proportions, resulted in high accuracy figures on known positive and negative sera.

More uniformity and standardization is needed before any large scale testing program can be undertaken, which will require additional research for facts on which to base standardization.

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Stages of bovine leptospirosis are relatively short. Leptospiremia extends for four to six days, two of which are marked by elevated body temperature and inappetence. Thereafter, organisms localize in the kidneys (tubules leading from glomeruli) where they may be demonstrated for periods up to one year.

NEW YORK STATE MASTITIS RESEARCH AND CONTROL PROGRAM

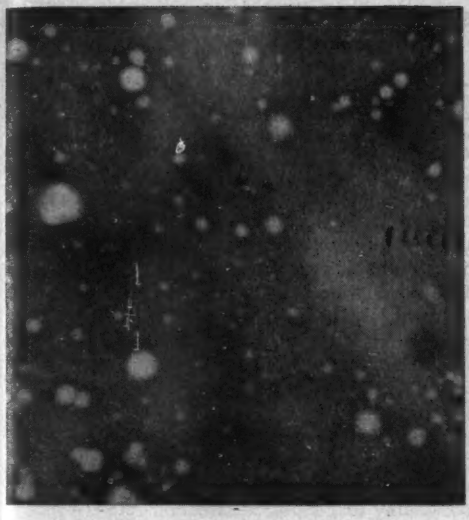
Abstract of paper presened by H. G. Hodges, D.V.M., Supervising Veterinarian, Mastitis Control Program, New York State Veterinary College, Cornell University, Ithaca.

Practical application of knowledge gained through research was the stated objective of the Mastitis Control Program when it was established in New York eight years ago. To date, over 4,000 herd owners have received some service. During the past fiscal year, more than 81,000 cow examinations were made and approximately 2,000 complete, and over 1,000 incomplete, surveys. It is estimated that only 5% of the herd owners of commercial farms of the state have received service of personnel assigned, which though small, provides substantial basis for conclusions as to the value of the program.

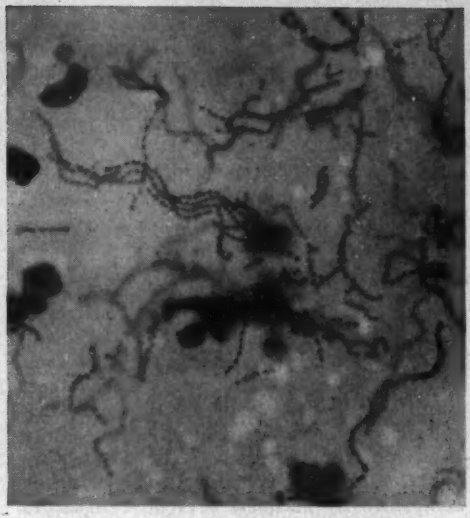
Estimates prepared by Livestock Conservation, Inc., place the loss in the United States from bovine mastitis at $100,000,000. annually. This appears low since the loss in New York alone is estimated at $25,000,000. annually considering only the factors of milk and cattle losses and costs of treatment. Substantial savings of program cooperators was reported.

Today, the New York Mastitis Program includes studies in basic research in addition to field control activities. There is a research laboratory located at Ithaca and six field laboratories at widely separated points in the state. Each field laboratory is staffed by a veterinarian, laboratory technicians, and other personnel as required to man the service requested. Herd examinations and surveys are made by field veterinarians in cooperation with private practitioners. An examination is made of each cow's udder and the secretions of each quarter. Abnormal secretions are invariably pointed out to farmers as tangible evidence he can see. He previously has been made aware that absence of abnormal secretions is associated with high production of a quality product. Conversely, flakes, clots, blood streaks, et cetera in milk are closely associated with disease and unprofitable production. These clinical manifestations have significant importance. Culture studies are conducted at laboratories and microorganisms classified with specific infected quarters.

The state provides services of the field veterinarian and laboratory analysis. Each dairyman must pay his own veterinarian for services provided for examination, collection of sam-



The microscopic appearance of high-grade milk produced by a cow free from udder infection.



Infected milk: Streptococci and leucocytes in excess of one million per cc. X 1500.

ples, and treatments.

In the course of some detailed discussion of research activities, the speaker related studies that led to the conclusion that "the teat canal is definitely a true barrier to infection of the gland with *S. agalactiae*." The trauma theory as predisposing mastitis is accepted. Teat injuries, no matter how slight, appear to interfere with the natural barrier to infection allowing entrance of pathogenic organisms. The most important of these injuries is the improper use of the milking machine. Many factors concerned in machine-milking and its use may be responsible for avoidable incidence of mastitis.

Responsible Environmental Factors

The speaker listed seven environmental factors determined by statistical data to be of relative importance. Neglect of any one may easily destroy, largely or completely, benefit derived from the practice of all. Points listed according to their relative importance include:

1. Use of the milking machine.

2. Veterinary service—diagnosis and treatment.
3. Dipping teats in an antiseptic solution daily.
4. Adequate stall beds (size, cleanliness, bedding).
5. Absence of teat and udder injuries.
6. Absence of mud and herd dust.
7. Mastitis-free replacements.

Treatment

No herd disease problem is more complex than bovine mastitis. None is so badly handled by owners. Misconceptions of cause and control and value of treatment have been confusing. Potent agents for treatment and wide claims for their use has led toward reliance on treatment and a false sense of security. Treatment is most effective when accompanied by adequate preventive measures. Promiscuous use of antibiotics without regard to specific infection often creates a highly aggravated state of mastitis infection and udder troubles. Practitioners report increasing numbers of cases of difficult, acute mastitis, uncommon only a few years ago or when antibiotics first came into use. This does not deny, in any way, the efficacy of antibiotics for the treatment of mastitis. A sound approach to a well conceived program considering mastitis as a herd problem has been shown to be the only method of assuring results. Treatment without prevention is of little lasting value to the herd owner. Highly resistant pathogens capable of causing systemic reactions, as well as local manifestations of udder infection, which are frequently fatal, gain entrance through careless and promiscuous treatment. In consideration of these and other known facts about this too-common malady of dairy cows, correctly elected treatments administered by, or under the supervision of, a qualified veterinarian, are basic factors of success in any control efforts.

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Mastitis is likely to continue as a major disease problem of dairymen. Coordinated management and sanitary practices offer the best prospect for successful control in large herds.

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Abortion in swine due to leptospirosis generally occurs during the last two weeks of gestation. Sows become infected at breeding or during pregnancy.

STATUS OF FEDERAL-STATE COOPERATIVE TUBERCULOSIS ERADICATION

Notes of address presented by A. F. Ranney, D.V.M., Chief, Tuberculosis Eradication Section, Animal Disease Eradication Branch, A.R.S., USDA, Washington, D. C.

During more than 30 years of operation, the tuberculosis eradication program has reduced the infection rate in the United States from 5% to 0.11%, a rate unchanged in three years. Justifiable pride can be taken in the accomplishment, yet threatening foci of infection exist. It must be remembered that the present incidence is based on testing only 10.8% of the nation's 94,677,000 cattle. However, testing now is more or less selective in giving consideration to areas and herds where experience has shown that more reactors likely are to be found. From this it may be concluded reasonably that reported infection rate is probably higher than actual in the nation as a whole. During 1954, 10,234,665 animals were tested and 10,886 reactors found. This represents the largest number tested since 1942.

When disease incidence is down to levels represented by present rate of tuberculosis, returns are small. Nearly 1,000 animals must be tested in about 45 herds to find a single reactor.

Again this year emphasis was placed on tracing origin of lesion cases found at slaughter. Initial stress was given this work in 1946 and liaison between meat inspectors and field forces was strengthened.

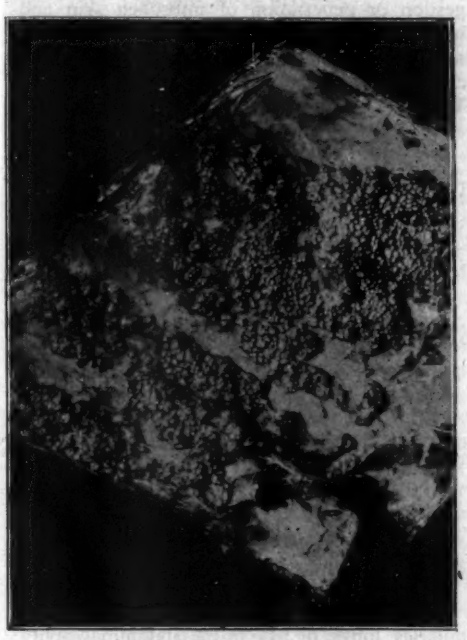
It is newsworthy that 15% of total reactors found during the past year were located through reports of meat inspectors. Much patience and detailed work was involved in these since market, salesbarn, and dealer records were not always adequate to determine source. Doctor Ranney cited examples of unique methods employed to reveal infected herds. In one instance, 1000 animals were tested in 25 herds as a result of lesions found on the carcass of a Shorthorn bull. As a result, seven foci of infection were located in two states and 41 cattle were found to be reactors.

The meat inspection service reported 1,299 carcasses exhibiting gross lesions during the fiscal year 1954. Of these, 577 cases, or 44%, were investigated. It was pointed out that this record is improved considerably, since last year. Over half of lesion cases found were not investigated to determine source of disease, largely for reasons of lack of identification.

PRESENT STATUS OF BOVINE-TYPE HUMAN TUBERCULOSIS IN THE UNITED STATES

Notes from paper presented by James H. Steele, D.V.M., M.P.H., Communicable Disease Center, Public Health Service, U. S. Department of Health, Education, and Welfare, Atlanta, Georgia.

Though the annual death rate due to human tuberculosis has declined at an accelerated rate during recent years, it is estimated that there are now 1,200,000 cases of which 400,000 are active and 800,000 inactive, in the United States. The drop in reported deaths is a tribute to improved medical and surgical care of patients.



Tuberculosis lesions of the pleura

Bovine type tuberculosis in man is rare. Extrapulmonary type is often caused by the ingestion of contaminated cow's milk. Pulmonary tuberculosis, however, may be due to the bovine tubercle bacilli, particularly in rural areas. One epidemiological investigation reported revealed that 94% of the patients suffering bovine-type phthisis had been in contract with "strongly infectious" cattle. It becomes increasingly apparent that open bovine lesions are just as infectious as open lesions due to human type organisms. The observations suggest that pasteurization of milk and milk products, a comparatively easy process, can not be expected to prevent transmission of infection from cattle to man, but that it must be considered as an occupational or environmental disease as well.

An outbreak of bovine tuberculosis that had been discovered in area testing was noted on the routine report of a state veterinarian's office. One herd of 34 cows reported eight reactors and another of 36 animals had 27 reactors to the tuberculin test. Postmortem examinations revealed gross lesions. A subsequent investigation by health department officials disclosed that over 200 families received raw milk supplied by these two dairies. Skin patch tests of 119 school children revealed 66 positive reactors even though authorities insisted raw milk was used only for cooking. A number of these children had enlarged cervical lymph nodes, and though in no instance was *Mycobacterium tuberculosis*, var. *bovis* cultured, histopathological observations were noted to be similar to that of tuberculosis.

The speaker concluded his remarks by suggesting that testing measures be continued aggressively and that whenever evidence of disease is found that local and state health authorities be made aware of the outbreak.

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LEPTOSPIROSIS IN SWINE

Abstract of paper presented by E. H. Bohl, D.V.M., Ph. D., T. E. Powers, D.V.M., and L. C. Ferguson, D.V.M., Ph. D., Department of Bacteriology, Ohio State University, Columbus, and Department of Veterinary Science, Ohio Agricultural Experiment Station, Wooster.

Veterinarians are concerned with leptospirosis in swine, not only from the standpoint of illness produced in infected swine, but also because of its public health significance. The disease is transmissible to other animals and man.

Leptospirosis designates infection by one or another of several known species of the genus Leptospira. Information available now indicates that the most important species is *L. pomona* though others have been identified. Some evidence indicates widespread infection, particularly in the Midwest. In one group of samples tested 22%, and in another, 3%, were seriologically positive. Clinical signs may be slight or transitory and may be of little concern to growers except in pregnant sows, in which case death of feti and subsequent abortion may occur. Furthermore, it is known that Leptospira are eliminated in the urine of apparently health hogs for variable periods, possibly for one year. Such shedders of organisms

then serve to transmit the disease to other swine, cattle, horses, sheep, and man.

Knowledge concerning mode of transmission and reservoirs of infection is limited. Swine appear to be the most important carriers among domestic animals, but rodents, such as field mice, may be important reservoir hosts. The roles of streams, ponds, and surface water in transmission is not clear. Transmission by boars is also possible if not probable. Diagnosis also requires further study. Reliable seriologic tests are sensitive and accurate. In this connection, it has been shown that seriologically-positive animals may not be carriers.

Significance of this disease in man, known in Europe as swine-herd's disease, has not been evaluated in the United States. Immunization may be of value on susceptible gilts and broad-spectrum antibiotics are effective for treatment and relief of the carrier state.

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THE SWINE KIDNEYWORM

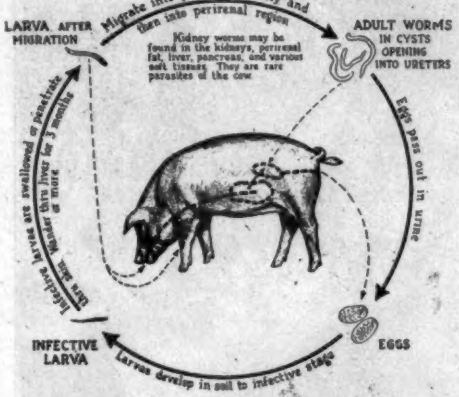
Abstract of paper presented by Lloyd A. Spindler, B.S., Sc. D., and John S. Andrews, B. S., Sc. D., Parasite Research Branch, A.R.S., USDA, Beltsville, Md.

The purpose of this report was to bring up-to-date information accumulated over the past several years about this parasite.

The kidneyworm of swine is responsible for significant losses, particularly to southern swine growers. It is considered one of the most important in the South though by no means is it restricted within the limits of that section of the country. Annual losses from kidney worm infestation in the South are estimated at more than $2,700,000. due to condemnation of organs attacked, in addition to those losses suffered due to arrested growth and development and interference with proper utilization of feed.

Parasite and Its Life Cycle

The kidneyworm (*Stephanurus dentatus*) of swine is a thick, black and white nematode that may reach an adult size of 2 in. in length. Sexually mature worms occur primarily in cysts within the walls of ureters having a short fistula opening into its lumen. Others may be found in the kidney tissue proper. As many as 70,000 to 1,000,000 eggs have been observed to pass in the urine of infected animals in one day. Under ideal moisture, shade, and temperature, eggs hatch on the soil, followed by growth to free-living through two preinfective stages to the stage of the life cycle when they are infective for swine. Entrance to the body of the host is gained through ingestion or penetration of unbroken skin and by way of the blood stream to the liver. Immaturely, kidneyworms occur principally in characteristic cirrhotic lesions and adhesions. They occur also in blood vessels, perirenal fat,


LARVA AFTER MIGRATION
Migrate into peritoneal cavity and then into perirenal region
Kidney worms may be found in the kidneys, perirenal fat, liver, pancreas, and various soft tissues. They are rare parasites of the cow.
ADULT WORMS IN CYSTS OPENING INTO URETERS
Eggs pass out in urine
EGGS
Larvae develop in soil to infective stage
INFECTIVE LARVA
Infective larvae are swallowed or penetrate. Wander thru liver for 3 months or more then back

Life Cycle of the Kidneyworm of Swine

muscles, lungs, or free in the abdominal cavity and elsewhere.

Distribution and Prevalence

Reports of incidence of this parasite in farm-raised pigs in the South range from 78 to 94%. Examination of liver of hogs slaughtered in Chicago suggest an incidence of 40% as revealed by liver lesions. Thus it is

Kidneyworm (stephanurus dentatus) of swine. Entire worms, lateral view. Large illustration, female enlarged. Upper small illustration, male, natural size; middle, female, natural size. From Taylor.

seen that kidneyworm disease is of vastly greater economic significance than ordinarily associated with it.

Control measures recommended are based on the demonstration of susceptibility of eggs and larvae to sunlight and drying. Limited trials have been encouraging but these have not received approval of swine raisers. Chemical treatment of pastures and lots has been recommended. Management practices that farrow only gilts or young sows appears also to be sound practice in view of the observation that infected swine may not void eggs until two or three years of age.

Committee Reports

SWINE BRUCELLOSIS

Report by J. R. Hay, D.V.M., Chief, Division of Animal Industry, Columbus, Ohio, chairman.

A questionaire submitted by this Committee has disclosed that 13 states now have a control program for swine brucellosis in operation. Though differing in certification period, recommended age of testing, and requirement for handling swine for exhibition, the experience gained during the past five years has indicated value of testing programs and herd certification.

The Committee outlined definite recommendations toward standardization of the control program in all states. Basis for certification would be two negative tests on the entire drove. Tests shall be made at 30 to 90-day intervals on all animals over six months of age. No agglutination test may be positive 1:100 or higher. Certification period would be valid for 12 months. Recertification to be given on a single clean annual retest on the entire drove.

Three plans of control were suggested as follows:

Plan 1. (for commercial droves)

(1) Market entire drove for slaughter.

(2) Clean and disinfect premises.

(3) Replace with certified brucellosis-free stock.

(4) Two negative tests 30 to 90 days apart make new herd eligible for certification.

Plan 2. (for purebred droves)

(1) Separate pigs from sows at weaning age or younger.

(2) Market infected animals as soon as practicable.

(3) Test gilts prior to selection of breeding stock and 30 days before breeding. Save only negative gilts—breed only to negative boars.

(4) Retest gilts, cull positive, select only pigs from negative gilts for breeding.

(5) Repeat if necessary.

Plan 3. (General—small droves)

(1) Remove reactors from farm.

(2) Retest at 30-day intervals, removing reactors, until all are negative.

(3) Two clean tests (30—90 days) qualifies for herd certification.

(4) If unsuccessful, abandon and adopt plans 1 or 2.

The Committee concluded its recommendations by urging adoption of requirements of brucellosis-free status for interstate movement of exhibition and breeding stock.

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ERADICATION OF HOG CHOLERA

Report by L. M. Hutchings, D.V.M., M.S., Ph. D., Purdue University, Lafayette, Indiana, chairman.

This Committee, organized in 1951, presented its first report at the Kansas City meeting in 1952 (See VETERINARY MEDICINE, 47:17 [Jan.], 1953). In this it is stated that by enthusiasm and interest of swine raisers, veterinarians, and disease control officials eradication of hog cholera is possible. The Committee cautioned that any relaxation of efforts during the crucial period now at hand, may result in loss of momentum that may not be possible to regain promptly. The lessened incidence of hog cholera during the past year may tend to allow eradication efforts to slacken. Furthermore, unless leadership is provided, and the program is adequately financed at the national level, gains are unlikely to be significant.

Hog cholera should be made a reportable disease. Intelligent reports are necessary to effective action against enemy invasion.

Swine growers are asking for evaluation of modified vaccines. "It is not possible," states the Committee report, "to definitely answer this all-important question at this time. The answer will come with continued use of the

new vaccines and the passage of time." Original claims that the modified vaccines are so adapted to foreign tissue that they are incapable of producing disease has not gone unchallenged. That they are less infective is proved. However, the Committee states that it has not yet been made clear, "whether or not all of the new products will prevent the spread of cholera to unvaccinated pigs under all circumstances."

Results of a recent poll reveal that 45% of farmers in the ten top swine-producing states use virulent virus and serum for immunization.

Approximately 32% use modified live virus with serum, 13% modified live virus without serum, and 10% use tissue vaccines. Gains favoring the modified live virus vaccines are substantial.

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TRANSMISSIBLE DISEASES OF SWINE

Report by J. D. Ray, D.V.M., Director, Affiliated Laboratories, Whitehall, Illinois.

A comprehensive picture of the transmissible disease problem in swine was obtained from return of questionaires mailed to all state sanitary officials. From this it was learned that the incidence of hog cholera remained unchanged generally.

Erysipelas was a greater factor in swine disease problems during the past year. Increased incidence was noted in 15 states, five of which are major swine producing areas. The Committee called attention to experiments conducted by Dr. Richard D. Shuman and the fact regarding conferring passive immunity to baby pigs by sow vaccination. Reference also was made to the new bacterin made available commercially. These show promise but need further evaluation.

A contagious, virus or virus-like disease in cattle new in California was reported by Dean D. E. Jasper, School of Veterinary Medicine, University of California, Davis, as an acute, febrile, influenza-like condition. Outbreaks among large lots of feeder cattle were reported in which resulting morbidity and mortality was significant. Symptoms were not uniform and pathological lesions varied. Intensive studies are progressing to determine etiology.

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Growth in ruminants is directly related to rumen activity.—*E. J. Czarnetzky, Ph.D.*

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The two most critical problems to be resolved in regard to atrophic rhinitis are the carrier pig and the nonlesion case.—*F. W. Schofield, D.V.M.*

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As a direct result of vaccination of dogs, no human death due to rabies has occurred in Israel since 1950. Number receiving the Pasteur treatments has been reduced from 2,035 administered in 1949 to 471 in 1951.

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Uniform, successful results with benzene hexachloride (BHC) dip have been reported in area control work for scabies in cattle and sheep.

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Recent outbreak of scabies in five southwestern and western states made dipping and spraying of large numbers of animals and inspection of 100,000 head necessary. A solution of 0.075% benzene hexachloride (gamma isomers) was employed as a spray for cattle and apparently has controlled satisfactorily the extensive outbreak. Final examinations will be made during the winter and spring months to determine effectiveness of these eradication measures.—*H. E. Kemper, D.V.M.*

The importance of thorough saturation of the underline escutcheon, and axillary space with spray material, cannot be overemphasized. Lesions of scabies are common in these body regions.

INFECTIOUS DISEASES OF CATTLE

Report by S. H. McNutt, D.V.M., Department of Veterinary Science, University of Wisconsin, Madison.

This Committee limited its considerations to mastitis, leptospirosis, and mucosal disease complex.

In regard to the latter, it was noted that, though symptoms of virus diarrhea, mucosal disease, and others that resemble each other, some evidence exists that separate etiological agents are responsible. A virus has been isolated in California, and determined to be the cause of virus diarrhea. Limited studies of a similar syndrome in Indiana calves indicates that it is not related to virus diarrhea. Much work needs to be done on these diseases that may be confused with rinderpest, particularly in reference to actual agent, means of transmission, and their economic importance or potential. Institution of both treatment and control measures awaits results of research.

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MORBIDITY AND MORTALITY

Report by W. L. Bendix, D.V.M., State Veterinarian, Richmond, Virginia, chairman.

In a brief report, this Committee revised its recommendations that the U.S.L.S.A. undertake statistical reporting and stated that it is now the official opinion that the matter of animal morbidity and mortality reporting is the responsibility of the federal animal disease regulatory agency. It recognized that the combined efforts of all professional groups will be needed to establish an adequate reporting system and offered the cooperation of the U.S.L.S.A. An immediate start on the preparation of a manual of reportable diseases was urged.

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An extensive investigation is underway at the University of Wisconsin at Madison on the use of phenothiazine in small, continuous doses for the control of internal parasites of cattle. The program is scheduled to be continued for five years under controlled conditions and will provide records on milk production, growth, breeding efficiency, et cetera. A similar project in progress on the *Hoard's Dairyman* herd already has revealed some apparent advantages of continuous supplementation of feed with this anthelmintic.

RABIES

Report by V. D. Chadwick, D.V.M., State Veterinarian, Jackson, Mississippi, chairman.

Included in the Committee report was the USDA annual incidence report for 1953 (see VETERINARY MEDICINE, 49:253 [June], 1953) and accummulated figures of positive cases in all animals for period 1938 to 1953. During these 16 years, figures collected by the Department disclosed that a total of 139,346

Photo courtesy Revista do Departamento Nacional da Producao Animal, Rio de Janeiro, Brasil.

Desmondus rotundus, a true vampire bat of South America, modified to subsist on blood. When present in numbers, are dangerous to man and domestic animals; sometimes vectors of rabies among cattle.

cases of rabies were reported of which 109,401 were in dogs and 9,863 in cattle. During this same period 421 human cases were reported; the annual incidence ranging from a high of 53 to a low of nine.

Most important development during 1954 was the discovery of the disease in insectivorous bats for the first time in the United States (see VETERINARY MEDICINE, 49:133 [Apr.], 1953, and 49:206 [May], 1953). Epidermiological significance of these findings is now under investigation.

VESICULAR DISEASES

Report by F. J. Mulhern, D.V.M., Animal Disease Eradication Branch, Agricultural Research Service, USDA, Washington, D. C.

When incidence of any disease increases in any part of the world today, its likelihood of spread to our nation is proportionately increased. Canada experienced its foot-and-mouth disease outbreak at a time when this disease was raging in Western Europe.

According to information released by the International Office of Epizootics, incidence of foot-and-mouth disease in Europe, Asia, and Africa is comparatively low. During 1952,

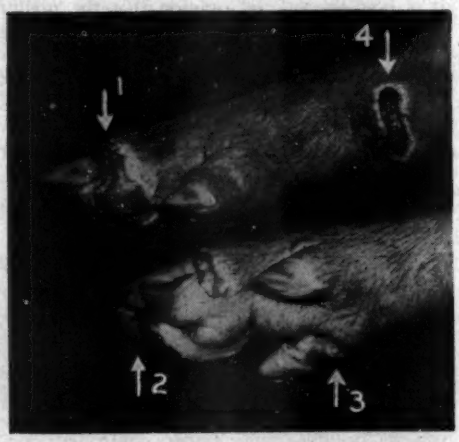
Vesicular stomatitis in a cow. Note freshly ruptured vesicle at the site of a gingival inoculation.

France reported 320,016 separate outbreaks and only 5,513 for 1953. Western Germany 54,572 for 1952 and 2,012 for 1953. Infection reported indicates lessened incidence during the first half of 1954. Neither has the disease run its usual spectacular course in South America during recent months. Hazards of foot-and-mouth disease, though a continuing threat, is less serious than it has been for almost ten years.

The Committee quoted from report of a study group organized in Great Britain for the purpose of reviewing all factors pertaining to foot-and-mouth disease control. After investigations in England and nine countries where the disease is enzootic, they concluded that "stamping-out" (slaughter) procedure was to be recommended since it is the only certain manner of eradication, or even effective control. Considering short duration of immunity induced by vaccination, such method appeared impractical.

Early vesiculation in swine due to vesicular exanthema. Note large vesicles on the sole of lower claw near heel and lateral margin, and another near the posterior cleft margin of the sole of the upper claw. Temperature of this animal was noted to be 104.8 F. at the time photograph was taken.

The Committee is convinced that if foot-and-mouth disease ever appears in the United States again, it must be discovered promptly and eradicated by slaughter of infected and exposed animals before it becomes established, even in limited areas, if we carry out our re-



Vesicular exanthema. Appearance of feet in advanced case (approximately ten days). Extensive area of granulation (1) on coronary band, most of the heel and sole. Slough of sole (2), and around dewclaw (3). Decubital sore (4) common in many affected animals.

(Continued on page 37)

Some Clinical Aspects Of Canine Nephritis†

K. W. SMITH, D.V.M., Sioux City, Iowa

NEPHRITIS is now regarded as one of the most common and most devastating diseases affecting the canine species. Pathologists agree that the majority of dogs have kidney lesions by the time they reach middle age, and it has been estimated that 50% of old dogs die from kidney disease. By way of comparison, it is interesting to note that nephritis in other species of domestic animals is a rather rare condition. Why, then, is the dog so susceptible to kidney disease? It is the result of some inherent weakness, or is it due to something peculiar to canine environment?

The exact cause for such a high incidence of nephritis in dogs has not been established definitely. However, many contributing factors are known and are worthy of discussion.

Etiological Factors

The kidney is one of the vital organs of the body serving as the principal "purifier" of blood, serving to remove nitrogenous waste products and foreign substances. In carrying out these functions, it is subjected to many forms of irritation such as toxins, poisons, catabolic products, and microorganisms. Irritants carried to it *via* the blood stream account for most cases of nephritis. Ascending urinary infections and trauma are relatively minor causes.

Of all the etiological factors of canine nephritis, infection is probably most important. Numerous different types of microorganisms have been isolated from diseased kidneys. Those of special clinical interest are Leptospira, *Escherichia coli* and streptococci.

Leptospira infection is probably much more prevalent than ordinarily suspected. This is indicated by the high incidence of reactions to the agglutination test among adult dogs. It is apparent that many dogs pass through a mild or subclinical form of leptospirosis which is not recognized. However, even in these cases the kidneys may undergo damage which eventually could lead to nephritis. In clinical leptospirosis, the kidneys are always affected, and most of the symptoms are those of acute uremia caused by leptospiral nephritis.

E. coli infection is often found in the kidney, where it is believed to occur mostly secondary in internal lesions. A close relationship is known to exist between intestinal and kidney disease. When intestinal function is disturbed, there is absorption into the blood stream of toxic substances and microorganisms which irritate the kidneys, creating a favorable location for the *E. coli* infection. On the other hand, it is well to remember that gastrointestinal symptoms also occur as a result of kidney disease, especially in acute uremia, so it may not always be possible to say whether the intestinal symptoms are the cause or the result of nephritis.

Streptococcal infections of the kidney are usually secondary to other foci of infection, particularly of the upper respiratory tract, tonsils, and teeth, to a lesser degree the prostate gland, anal glands, and other parts of the body. Evidence strongly supports the idea that focal infections play an important part in the

†Presented at the 20th annual meeting of the American Animal Hospital Association, Minneapolis, Minn., May 6-9, 1953.

etiology of kidney disease, especially in older dogs.

A great many chemical poisons, both organic and inorganic, are capable of causing nephritis. This group is not believed to be particularly common. Turpentine, coal tar preparations, and heavy metals are a few examples of the wide variety of chemical substances known to cause kidney damage. It is well to keep in mind the possibility of poisoning, although, in the writer's experience, proved cases have been entremely rare.

Nephritis also may be caused by toxins originating from various sources such as bacterial and parasitic toxins, and those derived from tissue destruction by burns or excessive catabolism.

Too much protein in the diet, especially if it is of low biological value, has been suspected as a contributing factor in kidney disease. This is most likely to cause trouble if there is a pre-existing nephritis, in which case the excessive protein waste products would hasten the onset of uremic symptoms. Likewise, insufficient fluid intake probably does not cause nephritis, but may contribute to uremia in cases of impaired renal function.

Chilling, fatigue, and trauma often help to initiate a clinical case of nephritis. In many of these, no doubt a pre-existing subclinical type is transformed into a more acute type. This is observed especially in chronic nephritis, in which acute exacerbations often follow chilling or overexertion.

Canine hepatitis, distemper, and other related virus diseases no doubt, play a part in the etiology of nephritis, although the exact relationship is not definitely established.

The above group of etiological factors, while by no means exhaustive, does serve to illustrate some of the more important causes, and exemplifies the wide variety of factors involved, in renal inflammations in the dog.

Classification of Nephritis

Nephritis usually is classified pathologically according to the structures principally affected; thus, glomerulonephritis, tubular nephritis and interstitial nephritis. Although glomerulonephritis is the most common type seen in man, the interstitial type is of paramount importance in the dog[1]. From the clinical standpoint, canine renal inflammations occur either as acute nephritis or chronic nephritis, both of which are primarily of the interstitial type.

These two forms differ considerably with regard to symptoms, diagnosis, and treatment. Therefore, each will be discussed separately.

Acute Nephritis

Acute nephritis is characterized by sudden onset and rapid course. Symptoms originate, for the most part, either from kidney pain or from renal insufficiency. The pain accounts for symptoms of stiffness in the hind parts, reluctance to move, abnormal arching of the back, and resistance toward palpation in the kidney region. Many dogs show little or no evidence of pain and the symptoms are largely those of acute uremia resulting from impaired kidney function. The most prominent uremic symptoms are inappetance, listnessness, and persistent vomiting. At first, the vomitus may contain food, but later it consists of a yellowish fluid and blood. The owner is convinced his dog has been poisoned or eaten ground glass. Often the dog has a craving for water, but vomits almost immediately after drinking. Dehydration of body tissue is rapid. At first, there is a stasis of the lower bowel, but later a diarrhea may appear. Blood often is observed in the fecal material or on the thermometer. The temperature is either normal or elevated in the early stages, but drops to subnormal in the later course of the disease. Congestion of the pericorneal blood vessels often is observed. Urine secretion is either reduced (obliguria) or suppressed entirely (anuria). In the final stages, uremic spasms are followed by coma and death. The uremic mouth does not occur in the acute form as it does in the more chronic cases.

Clinical Pathology in Acute Nephritis

Urinalysis should be a routine procedure on all sick dogs. In acute nephritis, the urine usually is reduced in quantity, highly colored, and often turbid. The specific gravity is either normal or slightly increased, albumen is abundant, tests for blood may be positive, and renal casts usually can be found.

Renal clearance tests give some indication as to the degree of kidney damage. Remember that 80% of the kidney tissue must be incapacitated before there is any interference with normal kidney function. On the other hand, reduced renal function is not always the result of nephritis. Either blockage of the urinary execretory passage, or insufficient blood supply to the kidneys can cause uremia. The latter is seen in cardiac disease and in obstructions of the renal arteries. Nevertheless,

nephritis is by far the most common cause for impaired kidney function.

There are many different tests for kidney function, but the one in most common use is the test for blood urea. This test is simple and requires a minimum of equipment. In acute nephritis, the blood urea may be increased from a normal of 20 to 40 mg.% to as high as 300 mg.%. The higher the blood urea, the less favorable the outcome.

Diagnosis depends, to a large degree, upon laboratory findings, especially urinalysis. Nephritis must be differentiated from other conditions such as foreign bodies and obstructions of the gastrointestinal tract in which vomiting inappetance, and toxemia are symptoms. These symptoms occur in so many different diseases that laboratory procedures are the only means of accurately diagnosing nephritis. A catheterized specimen is first observed for physical characteristics. Then, specific gravity is checked and a test made for albumen. If these tests disclose nothing abnormal, no further tests are made. However, if the test for albumen is positive, microscopic examination of the sediment is then indicated to determine which portion of the urinary tract is affected. Finding of renal casts and abundant albumen are indicative of acute nephritis.

Treatment. When kidney function is reduced to the point where uremic symptoms appear, the situation is always serious, and requires immediate and heroic treatment. Every effort must be made to reestablish kidney function as much as possible. Parenteral fluid is especially useful, because it not only stimulates diuresis, but also combats dehydration usually present. Either 5% dextrose solution or 5% dextrose in saline may be used. In cases where persistent vomiting has depleted chloride reserves, dextrose in saline solution is praticularly valuable. On the other hand, when fluid therapy is continued, it is usually better to change to 5% dextrose without the saline because of the danger of chloride retention, a condition characterized by tissue edema, or dropsy. Parenteral fluids may be given intravenously, subcutaneously, or intraperitoneally. If the intravenous route is used, care must be exercised to avoid too rapid administration or excessive quantity at one time. There is danger of pulmonary edema and congestive heart failure from over-filling of the vascular system. In the initial treatment, 50 to 150 cc. of fluid may be given intravenously by the drip method and another 200 to 500 cc. by hypodermoclysis. As rapidly as the hypodermic fluid is absorbed, it should be replenished. In this way, fluid is utilized as needed by the body without overtaxing the vascular system.

A hypertonic dextrose solution, given intravenously, has a pronounced diuretic effect, and may be found useful in overcoming anuria. For this purpose, a 10% solution of dextrose is recommended.

Procaine intravenously is receiving recognition as a means of increasing kidney function. Two to 10 cc. of a 1% solution is administered slowly into the vein, and repeated at eight- to 12-hour intervals. Procaine may be mixed with dextrose solution, (0.2% procaine in 5% dextrose), and given by slow, intravenous drip.

Heat applied to the kidney region is used to help stimulate renal function in human medicine[8]. Heat is applied either externally or by diathermy.

One of the few conditions in which venesection is still advocated is for the relief of severe uremic symptoms. Here, it is said to be a life-saving measure, lowering the blood level of nitrogenous waste products enough to prevent a fatal termination until sufficient renal function can be reestablished.

Antibiotics are used routinely in the treatment of acute nephritis because infection is so frequently involved either as the primary cause, or as a secondary invader. In uremic cases, only injectable antibiotics are administered since vomiting precludes the use of oral medication. Penicillin is given in large daily doses for a period of at least four or five days. If the response is inadequate, other antibiotics that may be of value are streptomycin, terramycin,®[1] chloromycetin,®[2] and aureomycin®[3]. These are given intravenously when vomiting is present, otherwise they can be given orally. In order to treat kidney infections intelligently, bacteriological studies should be made of each case, but in practice this usually is not feasible. The clinician is obliged to follow the trial and error method, which is definitely not the most satisfactory. For the most part, penicillin does an excellent job of controlling kidney infections.

As urinary antiseptics, methenamine and mendelic acid have been relegated to secondary importance as compared to the antibiotics, they still are used in mild cases and during convalescence.

®[1]Chas. Pfizer & Co., Brooklyn, N. Y.
®[2]Parke, Davis & Co., Detroit, Mich.
®[3]Lederle Laboratories Division, Pearl River, N. Y.

Sulfonamides are contraindicated in cases of nephritis where renal function is impaired. This is because the sulfonamides are eliminated largely through the kidneys, causing added renal embarrassment. If sufficient kidney function is present, sulfonamides may be used with caution, but, even then, antibiotics are usually preferable.

In order to relieve the burden from the kidneys, elimination from the bowel should be encouraged as much as possible by the use of mild saline cathartics and low enemas. The difficulty usually is getting the dog to retain oral medication. In fact, no drugs given by mouth are of value during the period of uremic vomiting.

In cases of heart weakness, cardiac stimulants will increase renal output greatly, and thereby aid in the relief of uremic symptoms.

All food and water must be withheld until vomiting has ceased. Then water should be supplied in the maximum quantity that can be retained. At first, only a small amount of water is given frequentiy. The quantity is increased as rapidly as it can be handled by the dog until it can be given *ad lib*. An adequate intake of water will do more than anything else toward stimulating renal function.

After vomiting is under control, do not be hasty in getting the dog back on feed. At first, it is especially important to restrict the intake of protein foods. Milk with cereals, or other carbohydrates, usually are recommended in limited quantity at this time. However, a patient which has been losing albumen through the urine needs protein replacement as soon as possible. This should be supplied in a form that is utilized easily such as the proteins of milk and eggs. Proteins that are of low biological value have an excessive quantity of nitrogenous waste products. These proteins must be avoided in so far as possible. Special prepared diets developed by Dr. M. L. Morris (KD®[4]) for dogs with kidney disease are now available. These have simplified greatly the feeding of the nephritic patient.

Vitamin B complex is given routinely as general supportive therapy. The injectable form is used during the uremic stage and the tablet form is given orally during convalescence.

General care and nursing is important in the handling of acute nephritis. The dog should be kept at rest, and in a warm place out of drafts. Avoid over-heating during hot weather.

If the kidneys have suffered extensive, irreparable damage, all methods of treatment may fail. Many cases are brought to the veterinarian in the advanced stages of uremia when treatment is hopeless.

Chronic Nephritis

Chronic nephritis occurs either as an aftermath of acute nephritis, or more commonly, in older dogs, as an insidious disease without apparent cause. It develops gradually as the interstitial connective tissue of the kidney encroaches upon the parenchymatous. This results in interference with the resorptive function of the renal tubules, and inability of the kidneys to concentrate the glomerular filtrate. Thus, the volume of urine is increased (polyuria) and, at the same time, thirst is increased (polydipsia). These are the first and most constant symptoms of chronic nephritis. They frequently pass unobserved or their significance is not recognized. Many cases, when brought to the attention of the veterinarian, have progressed to the stage of renal insufficiency. The symptoms are those of chronic, low grade uremia, with general unthriftiness, poor appetite, and a tendency toward periodic digestive disorders. Slight changes in the diet or in the daily routine may bring on a spell of vomiting and diarrhea. These dogs are poor risks for hospitalization or surgery, since they go into acute uremia readily and may die quite suddenly. These are the dogs that supposedly "grieve themselves to death" when left in a veterinary hospital or boarding kennel. Any of us may get stuck with such cases now and then.

Dogs with chronic nephritis are poor risks for anesthesia, especially the barbiturates which are eliminated principally through the kidneys. Whenever a dog is slow coming out of anesthesia, it is usually because of impaired renal function.

Other symptoms are dry, scaly skin and a tendency toward eczemous skin lesions. Anemia, in varying degrees, usually is observed, and heart symptoms are not uncommon. Arthritis in many cases, seems to be associated closely with chronic nephritis. Excessive nitrogenous waste products in the blood may predispose to joint inflammation, or, more probably, focal infection is the cause for both the arthritis and the nephritis simultaneously. In advanced cases, so called "uremic mouth" is observed frequently which is

[4]Hill Packing Co., Topeka, Ks.

characterized by ulcers of the mucosa, loosening of the teeth, and a urinous odor that is quite diagnostic. Drinking excessive quantities of water and excretion of large amounts of clear, colorless urine are prominent symptoms.

Urinalysis reveals urine of low specific gravity and either an absence or only a trace of albumen.

The advanced, clinical case of chronic nephritis usually can be diagnosed fairly accurately on the basis of symptoms. However, diagnosis of earlier, or milder cases requires the aid of the clinical laboratory. Both urinalysis and blood urea tests are indispensable. In chronic nephritis, the large volume of clear, colorless urine, the low specific gravity and the absence or trace of albumen are characteristic findings. Blood urea tests show readings of 50 or 60 mg.% or more. During acute exacerbations, and in the advanced stages of chronic nephritis, blood urea may reach concentrations equal to those seen in acute nephritis. Symptoms of general unthriftiness, recurrent digestive upsets, skin disease, anemia and arthritis, especially in older dogs, may be indicative of chronic nephritis. Diabetes mellitus is similar in some respects, but quite different in others. The excessive thirst, large volume of urine, and loss in weight are seen in both diseases, but in diabetes mellitis, urine has a higher specific gravity, is positive for sugar, and there is usually an accompanying ravenous appetite.

No treatment is known for chronic nephritis that will reverse the pathology already present in the kidneys. However, by proper care and feeding, patients may be enabled to live fairly normal lives for a period of months or even for several years.

It is vitally important to supply an adequate amount of fluid in order to maintain as much kidney function as possible. This is the only means of compensating for the kidney dysfunction. The dog's water pan must be kept filled at all times and liquid diets may even be indicated in some cases.

The diet requires careful consideration in order to be certain that the dog is nourished properly, and at the same time, nitrogenous waste products held to a minimum. This can be done by balancing the carbohydrates, fats, and proteins properly, (using only proteins of good nutritive value), together with adequate minerals and vitamins. It is important to avoid an excessive amount of protein food, and especially proteins low in biological value. Milk and milk products with cereals, fats, and small quantities of egg and meat may be used. The prescription diet developed by Morris for nephritic dogs is a convenient way to feed the patient properly. Avoid overfeeding and all highly seasoned foods. Salt should be held to a minimum.

Antibiotics may be helpful in cases where active infection is present, especially during acute exacerbations. Likewise, parenteral fluids are helpful in controlling acute attacks of vomiting.

If focal infections are found, they should receive proper attention, including removal of diseased teeth, tonsils or anal sacs. Avoid chilling, strenous exercising or any sudden deviation from normal routine.

Although many dogs respond surprisingly well to treatment, eventually kidney function is impaired to such a degree that death occurs from uremia or its complications.

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Hormone Facial Creams

Simply in order to be informative, and not because it is a matter of veterinary interest there is reproduced herewith, in part, the summary and conclusions of an article by Howard T. Behrman, M.D. entitled, Hormone Creams and the Facial Skin. The entire article is in the May 8, 1954 issue of the *Journal of American Medical Association.*

"No appreciable difference was observed visually in the side treated with an estrogenic hormone cream as compared with the side treated with either the identical base without hormones or a commercial night cream having a very similar composition to the hormone cream. This study demonstrated that noticeable improvement in the appearance of women's dry skin can be obtained through regular use of an emollient cream. This study did not demonstrate that the addition of hormones to such emollient bases increased this improvement to any discernable extent."

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A total of 50 new graduates took the state board's examination in Missouri this spring, 90% of whom were Missouri graduates.

Cystitis And Urolithiasis†

WILLIAM V. LUMB,* D.V.M., M.S., Ft. Collins, Colorado

THERE is considerable literature[1,9,10,11,27,-28,34] based on clinical experience, concerning urolithiasis and cystitis in cats, but there does not appear to be any published article concerning this condition based on controlled experiments. This situation exists despite the fact that most practitioners agree that this is one of the most serious problems presented in cat practice today. Under these circumstances what has been said regarding treatment will be briefly reviewed. Following this is a summary of what is going on in the way of experimental calculous formation and treatment.

Some confusion exists as to whether the so-called "sabulous calculi" seen in cats are true calculi or are only precipitates composed of magnesium ammonium phosphate. Most authors[20,28] seem to agree with the latter theory which is supported by the fact that large concretions are seldom observed in cats. Because of common usage, these precipitates, if they are such, are referred to as calculi. Whether these are the cause or the result of cystitis is also not known, so for convenience the two can be combined with other signs and symptoms observed commonly with them such as urethritis, acute urethral block, bladder atony, and uremia and called the cystitis-urolithiasis syndrome.

This syndrome is confined almost entirely in males. Most authors state it to occur primarily in castrates but Kirk[20] and others believe this to be due only to the fact that more castrated males are seen. Certainly the anatomy and physiology of these patients renders them more susceptible to the acute manifestations of the disease.

From a questionnaire concerning this condition sent to some of the membership of this association, information was obtained indicating that a fairly clear-cut regimen of treatment was being used. Most often when a practitioner sees a cat with this syndrome it is because the patient is suffering from acute urethral block. Frequently the owner has mistaken the condition for constipation because the cat has been sitting on the sand box for a long time, straining and crying. Other times the animal is found in the yard in a semi-comitose condition and the owner is sure that it has been poisoned. The diagnosis is confirmed easily by palpation of the enlarged, hard bladder and observation of sand-like calculi in or around the urethral orifice. Often the penis is protruding and darkened due to restricted circulation. There is usually an unwillingness to move and, depending on the duration of the block, depression or coma. If the animal is semicomitose euthanasia probably is advisable.

Fig. 1. The penis is extruded prior to insertion of a probe-pointed needle.

In acute urethral obstruction immediate relief must be provided. This is accomplished by several methods, the choice depending upon the operator and the condition of the patient.

In some cases, where the stoppage is not severe and the patient lethargic, relief can be procured without anesthesia. However, in many cases anesthesia is desirable and necessary for restraint during surgical manipulations. The intravenous use of the short-lasting barbiturates gives good results. It must be remembered that these patients are suffering from impaired renal function and, therefore, are much more subject to anesthetic death. Any undue struggling with the patient should be avoided.

†Presented at the 20th annual meeting of the American Animal Hospital Association, Minneapolis, Minn., May 6-9, 1953.

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Most practitioners prefer irrigation of the uretha using a blunt or probe-pointed needle attached to a syringe containing sterile saline. With the patient lying on its back the penis is extruded (Fig. 1) and pulled posteriorly between the thumb and forefinger to straighten the urethra. The lubricated needle is introduced into the urethral orifice and gentle pressure exerted on the plunger of the syringe so that fluid washes out the urethra as the needle is advanced. Care must be taken to avoid trauma to the penis or urethral lining as swelling will ensue, making further catheterizations more difficult and increasing the chance of recurrent obstruction and stricture. Polyethylene tubing has been used in the clinic at Minnesota for irrigation of the urethra and bladder catheterization and has proved satisfactory.

A small, olive-point, whalebone bougie is used by some in obstinant cases where the preceding method is not sufficient. This is introduced into the urethra to the site of the obstruction and pushed into the obstruction or rotated in a drilling fashion. This is alternated with irrigations so that material loosened is thus removed, or forced back into the bladder. Due to trauma incurred with this procedure, it is best reserved for those cases which do not respond to other management.

Immediate aspiration of urine from the bladder through the abdominal wall has been advocated and is the only procedure possible in those cases where urethral flow can not be restored immediately. Some leakage is liable to occur with this procedure which is attended with some danger if a large gauge needle is used. The use of a 22 gauge needle has been recommended[17]. The clinic at the University of Pennsylvania reports the injection of sterile mineral oil into the bladder as useful in intractable obstruction to lubricate the urethral tract.

Urethrotomy above the penile bone is reported by Crawford[10] and Kirk[20]. This enables the operator to reach the site of the obstruction easier. Blakely[2] has treated intractable urethral obstruction or stricture of the extrapelvic portion of the uretha by amputation of the penis at the level of the ischial arch. Good immediate results were obtained, but he reports there is a tendency for the opening to close over after a time and recommends this treatment be used only as a last resort.

The use of antispasmodics in the treatment of acute block has been reported frequently. Following aspiration of the bladder through the abdominal wall, Schein[21] has recommended injection of a protein-free nitrogenous fraction of pancreas (depropanex®[1]). He reports that in a limited number of cases normal urination occurred in an average of eight hours. Irwin[19] and others[9,19,20] have recommended the use of methyliso-octenylamine (octin®[2]) in conjunction with digital pressure on the bladder.

Following relief of urethral block, treatment usually includes several of the following:

1. The administration of antispasmodics to relieve urethal spasm.

2. Use of antibiotics to control infection, particularly by urea-splitting organisms, which may be present. (These usually are given systemically, but in some instances practitioners report local injection into the bladder lumen.)

3. Changing the pH of the urine through the administration of ethylenediamine dihydrochloride (chlor-ethamine®[3]) or ammonium chloride, if the urine proves to be alkaline.

4. Reduction of the concentration of the crystalloids in the urine through dietary changes and the parenteral administration of fluids.

5. Administration of therapeutic amounts of vitamin A.

6. Testosterone therapy.

7. Injection of hyaluronidase to increase the protective colloids of the urine.

Despite the use of these measures, a relatively high per cent of these cases have recurrences which prove fatal. Therefore, an examination of therapeutic measures in the light of recent experimental work may be of some value.

It has been demonstrated by Higgins[14,15,16] that low vitamin A in the diet predisposes rats and dogs to calculous formation. Stones formed first in the bladder, later in the kidneys, were composed of phosphates and traces of carbonates. The urine always became alkaline. Concurrent urinary tract infections developed until, at 250 days, 70% were affected. However, the incidence of bladder calculi always exceeded the incidence of bladder infection indicating that infection was not the cause of stone formation. Withdrawal of other vitamins did not produce calculi.

Vermeulen and coworkers[21], at the University of Illinois, College of Medicine, found that calculi could be produced experimentally in rats by the surgical introduction of zinc

®[1]Sharp & Dohme, Division of Merck & Co., Philadelphia, Pa.
®[2]Bilhuber-Knoll Corp., Orange, N. J.
®[3]Pitman-Moore Co., Indianapolis, Ind.

foreign bodies into the bladder. These rats were fed a stock diet which normally did not produce calculi. After four to ten weeks the rats were sacrificed and the stones weighed. All rats did not develop stones, but in those which did, daughter stones were found commonly. Chemically the stones were magnesium ammonium phosphate ($MgNH_4PO_4 \cdot 6H_20$). Less than half of the stone-forming rats had urinary infection and the percentage forming stones was the same whether infection did or did not exist. The average pH of the urine was 6.8. In a few instances, where large stones were formed, the pH was found to be quite high and urea-splitting organisms were present. The foreign body was postulated to cause stone either (1) by inviting precipitation as a seed crystal, or (2) by changing urine composition perhaps through bladder irritation with exudation.

The importance of this experiment lies in the fact it demonstrates that, in some animals, introduction of a foreign body into the bladder is all the stimulus needed for stone formation. Also, it enabled these men to produce calculi routinely and, using this ability as a research tool, test the effects of various dietary changes and treatments.

To study the effects of urine volume on calculous formation, two types of experiments were formulated[19]. The first was an attempt to prevent stone development upon foreign bodies through chronic diuresis. This was produced by giving the rats 10% glucose to drink instead of water. According to the authors, rats apparently enjoyed the glucose solution and drank surprising amounts with a great increase in urine volume and no glycosuria. Two groups of controls were used; one being fed the stock diet and the other stock diet mixed with an equal amount of dry glucose. These two groups had free access to water.

The rats receiving the glucose solution had an almost five-fold increase in urine volume. The concentrations of magnesium and phosphorus in the urine were found to be inversely related to the urine volume and total excretion of both elements increased slightly. Under these conditions, glucose drinking fluid was found to be an effective stone preventive. None of the rats receiving it developed stones, whereas, 63% of the rats fed stock diet and 78% of the rats fed stock diet and glucose powder developed stones.

The second type of experiment was an attempt to dissolve calculi already formed in rats by chronic diuresis produced in the same manner. Of these animals 32% had complete dissolution of stones and more than half showed a reduction of stone weight in four weeks. The controls fed stock diet and stock diet plus glucose showed an increased weight of stone.

The effect of urine pH was demonstrated here. Some of the animals receiving the chronic diuresis treatment developed urinary infections with urea-splitting organisms (in this case Pasteurella or Staphlococcus). In these, the urine pH was above 7.5 and the stone grew despite diuresis. The authors noted that it is impossible to produce comparable diuresis in the human and maintain it.

In another experiment by the same group[22], the same methods used previously were employed again except 1.5% ammonium chloride, by weight, was added to the diet of one group of rats, 1.5% sodium bicarbonate was added to the diet of another group, and a third received the stock diet without supplementation and served as controls. Urine phosphate increased markedly in the acidified group but negligible stone formation took place. All of the controls developed stones. The alkalinized group showed slightly more stone formation than the controls. Using the same procedure on rats with preformed stones, after four weeks stones in the control group had grown, whereas, those in the acidified group showed a weight loss and 14 of 20 showed complete dissolution.

Schneider *et al.* [23] have shown that a high phosphorus diet or a diet high in phosphorus in proportion to calcium is the primary offender in the production of calculi in wether lambs. A calcium-phosphorus ratio of 0.5:1.0 produced a significantly greater number of calculi than a ratio of 1.25:1.0.

Shorr[24] and Shorr and Carter[25] have suggested the use of aluminum hydroxide gels *per os* in the treatment of phosphate stones. The aluminum forms insoluble aluminum phosphate salts in the intestinal tract with a corresponding decrease in the amount available for absorption and a proportional diminution of phosphate in the urine. The advantage to this line of treatment is that aluminum gels are not reduced in effectiveness in the presence of urea-splitting organisms in the urinary tract as are acidifying agents. Also, they do not introduce the hazard of acidosis in patients with impaired kidney function. These aluminum gels are available either in liquid or tablet form.

Vermeulen and his associates, using methods

previously outlined in this paper, tested the efficacy of this treatment on rats[29]. In this instance, one part in ten of the diet was aluminum hydroxide gel. Phosphorus excretion was lowered to one-third normal and the urine pH was raised. No stones developed in the treated animals, whereas, the controls again developed stones. Preformed stones were noted to show dissolution in some cases but many were relatively unchanged and a few increased in weight.

Using the same methods, rats were fed low magnesium diets and failed to produce the usual stones. Preformed stones dissolved completely in nine of 11 animals fed low magnesium diets. Increased magnesium in the diet caused larger stone formation than occured on the regular diet.

This brings us to the work concerning the role of the protective urinary colloids. Urinary colloids are substances, elaborated in the tissues and excreted in the urine, which surround the crystalloid particles also excreted in the urine. These colloids form a shell around the crystalloid particles and this is thought to prevent crystalloid accumulation and the formation of stone.

It was found by Butt and co-workers[3,4,5,6,7,8], that when hyaluronidase was injected subcutaneously into human patients, the amount of colloid present in their urine increased almost immediately and within 30 minutes the turbidity and sediment showed a visible decrease. In the absence of infection, 75% of their cases showed clarification of the urine after subcutaneous injection of 300 to 600 turbidity-reducing (TR) units of hyaluronidase.

In the presence of infection, the dosage requirements are said to be higher and may reach 1200 turbidity-reducing units every 24 hours. The amount administered must be regulated to the individual patient. In man, the effect of hyaluronidase is followed by observation of urine samples. These are allowed to stand at room temperature for one hour and then observed for turbidity or sediment. When these are seen, another dose of hyaluronidase is needed. Excessive doses appear to be well tolerated and the amount administered is regulated probably more for economic reasons than because of possible toxicity.

Hyaluronidase is produced commercially from bovine testes. It would be nice to be able to point out a direct relationship between the effects of castration on male cats and a decrease in urinary colloids. However, this can not be done at this time. Testosterone and estrone are known to enhance the synthesis and deposition of hyaluronic acid which is the substrate from which the colloids are produced by hyaluronidase. Therefore less protective colloid activity in the urine might be expected in neutered cats. Experiments have been performed on rats which suggest that estrone has more protective action than testosterone[29]. This being the case, the administration of estrone-testosterone mixtures might be indicated.

As was noted previously, many practitioners have employed testosterone therapy in the treatment of lithiasis in cats. Beneficial results were believed to be due, primarily, to increased tone of the urogenital tract and, perhaps, some increase in size of the urethral orifice over a long period. It may be that increased colloidal activity also occurred.

Helsby, Vermeulen *et al.*[13], in a paper just published, report the effects of hyaluronidase therapy on experimental calculous production in rats. Using the same methods as outlined previously, they injected hyaluronidase dissolved in normal saline solution into rats, six days a week, for six weeks. Half of the rats received five turbidity-reducing units and half received 15 turbidity-reducing units of hyaluronidase daily. Controls received normal saline. At the end of six weeks the rats were sacrificed and the stones weighed. There was no significant difference in amount of stone produced in the treated animals and the untreated controls. Of 20 controls, 16 had a calculous deposit of at least 10 mg. as compared with 21 of the 22 animals treated with hyaluronidase.

The urine colloid increase seen on hyaluronidase injection in man may not occur in rats, or, the foreign body may nullify or overpower the action of hyaluronidase through its irritating properties on the bladder mucosa. Therefore, they state it can not be said that hyaluronidase does not prevent stone formation, but it was of no value under this particular set of experimental conditions. These authors take issue with Butt and coworkers and state that though hyaluronidase does change the colloidal activity of urine there is no satisfactory clinical data suggesting that these colloidal changes alter the process of stone formation.

Other workers[20] are testing various types of solutions in an effort to find ones which will cause stone dissolution through irrigation of the urinary tract. There are no solutions avail-

able, at the present time, which appear to offer an answer to the problem as it exists in cats.

From these experiments it can be seen that stone formation is a complex process influenced by many factors. Until recently few of the theories which have been advanced concerning stone formation were supported by adequate proof in any animal. Diuresis, acidification of the urine, and a diet low in phosphorus or magnesium will prevent experimental phosphate stone formation and tend to cause dissolution of preformed phosphate stones in rats. It remains to be seen whether these factors have the same effect in cats.

During the preparation of this paper it was learned that there are at least four groups in this country engaged in study of the cystitis-urolithiasis syndrome in cats. Two of these studies are clinical and appear to be concerned with the clinical aspects of the condition which have, as yet, to be well established. These probably include age and sex incidence, seasonal variation, blood calcium, phosphorus, and vitamin A levels, urine calcium, phosphorus, pH and cultural determinations. Two other studies are purely experimental and are concerned with the effect of diet on the production of stones. It is quite probable, therefore, that a more comprehensive knowledge of this condition will be ours in the near future.

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Cancer of the Penis

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A mixed breed, male dog was presented with severe swelling of the scrotum and surrounding tissue. Symptoms presented were a mucopurulent discharge from the sheath, stiffness of the hind legs, temperature 103 F., and a palpable enlargement posterior to the bulb of the penis. The penis itself appeared normal. Diagnosis: Scrotal abscess, possibly secondary to neoplasm. The patient was placed on penicillin for ten days, at the end of which time the swelling and inflammation was reduced by 90% and fever had subsided. A small cauliflower-like growth was, by this time, apparent on the glans penis. Over a period of the next two weeks this growth increased markedly in size. A biopsy specimen was taken and a pathological report of round-cell sarcoma, probably of mast cell origin, was returned. The tumor was considered to be malignant.

Because of the malignant nature of the tumor and recent rapid growth, surgery was recommended. At this time, there was an

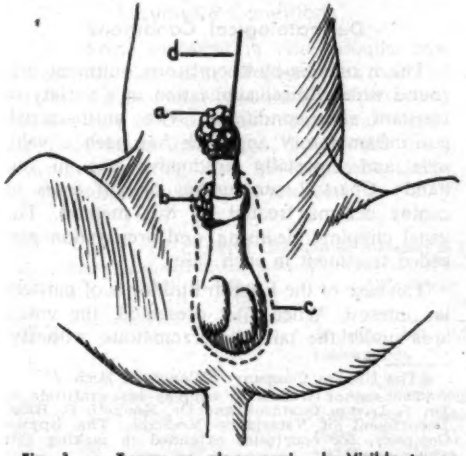

Fig. 1. a—Tumor on glans penis. b—Visible tumorous tissue on inside of sheath. c—Line of incision. d—Urethral catheter in place.

apparent invasion of the sheath adjacent to the glans penis but no other evidence of local invasion or general metastasis existed. Although the pathological study did not directly identify the carcinoma as being sex-related, a radical removal of the penis and scrotum was undertaken. This was done in the belief that the patient's life expectancy would be improved materially if the male hormone factors were removed.

The dog was prepared for surgery. Preanesthesia was induced with morphine, and atropine and intravenous nembutal® was employed for anesthesia. This patient had a confirmed cardiac disorder and great care was observed during the administration of the anesthesia. A urethral catheter was passed into the bladder to aid in locating the stub of the posterior urethra after severing.

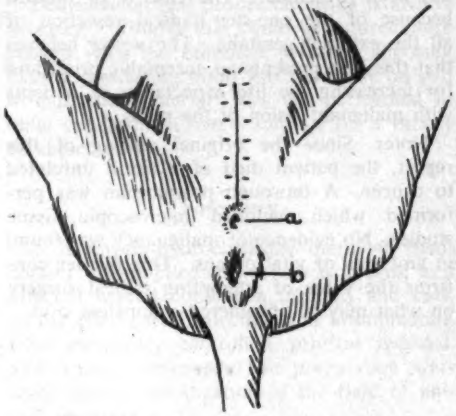

Fig. 2. a—Newly created urethral orifice. b—Anus.

Surgery

An eliptical incision was made beginning at the anterior end of the sheath and continuing around, posteriorly, to include the scrotum. This incision was made on each side of the sheath to completely circumscribe the area containing the penis, sheath and scrotum. Dissection was begun at the anterior end in order to separate the sheath from the abdominal wall. The dissection continued posteriorly to the spermatic cords. These were ligated and separated. The entire mass including sheath, penis, scrotum, and testicles were removed, leaving a short stub of the body of the penis in the ventral perineum. This stub, containing the posterior urethra was cut off at the level of the surrounding skin and sutured in place. By this procedure, a new urinary orifice was created just ventral to the anus. The skin defect was sutured with mattress sutures. Antibiotics were continued for ten days while the patient was restrained from licking and molesting the surgical area by two inflated rubber collars. Recovery was uneventful.

®Abbott Laboratories, North Chicago, Ill.

The patient today is a normal, active dog. Urinary passage is controlled by the sphincter at the neck of the bladder. No incontinent problems arose. The dog passes urine normally and without discomfort. It is interesting to note that although the urinary stream is now directed posteriorly, the dog still lifts his hind leg when urinating.

Summary

A clinical case history of cancer of the penis has been presented. The case is of interest because of the one-step radical resection of all the external genitalia. The writer believes that this case presents an acceptable procedure for increasing the life expectancy of patients with malignant lesion of the penis.

Note: Since the original writing of this report, the patient died of a cause unrelated to cancer. A thorough postmortem was performed which included microscopic tissue studies. No evidence of malignancy was found in any area of vital organs. This further confirms the value of attempting radical surgery on what may be considered a hopeless case.

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Clinical Use of Neomycin-Hydrocortisone Ointment in Dogs and Cats

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Neomycin-hydrocortisone ointment preparation (neo-cortef®) combines the broad-spectrum antibacterial action of the newer antibiotic, neomycin, with the anti-inflammatory action of the principle adrenal steroid, hydrocortisone. The ointment exerts prompt antibacterial and anti-inflammatory effect when applied topically, rapidly controlling edema, cellular infiltration, and pruritus.

In the present study, two potencies of the ointment were used.* One is the 1% ointment, containing in each gram: Neomycin sulfate, 5 mg., hydrocortisone acetate, 10 mg. The other is the 2.5% ointment, containing in each gram: Neomycin sulfate, 5 mg., hydrocortisone acetate, 25 mg. This study confirms the preliminary report of another author[1].

Ear Conditions

Neo-cortef ointment has proved effective particularly in treating canine otitis externa. In reported cases, ether was instilled into the external ear canal and allowed to soften deposits, which were then removed with cotton swabs. This procedure was repeated until the canal was clean. In one case, general anesthesia was necessary to accomplish this preliminary step. The ointment then was applied to every portion of the ear canal with cotton-tipped applicator sticks.

Although bacteriological identifications were not performed, it is reasonable to assume that contaminants were both Gram-positive and Gram-negative in nature. Existence of a greenish-yellow discharge in one case, as well as unresponsiveness to several other antibiotic ointments, suggested Pseudomonas infection. Neomycin has a high degree of action against this organism. Chart 1 summarizes these cases.

Dermatological Conditions

The neomycin-hydrocortisone ointment has found wide clinical application in a variety of resistant skin conditions. The antibacterial, anti-inflammatory approach has been a valuable and especially productive one in our hands. Chart 2 summarizes several cases of canine eczema treated by this method. The usual clipping, cleansing, and preparation preceded treatment in each case.

The case of the English Bulldog is of particular interest. When first presented, the entire area under the tail was eczematous, with fly-

®The Upjohn Company, Kalamazoo, Mich.

*The author wishes to express his gratitude to Dr. J. Lavere Davidson and Dr. Kenneth B. Haas, Department of Veterinary Medicine, The Upjohn Company, for courtesies extended in making this study possible.

CHART 1. Neo-Cortef Ointment in Canine Otitis Externa

Age yr.	Breed	Sex	Appearance	Procedures	Results
2½	Dalmatian	F	Inflammed, suppurative, ulcerative	Cleansed, 2.5% oint. applied daily for 10 days	Excellent
7	Eng. Bull	F	Greenish-yellow discharge	Cleansed, 1% oint. applied daily for 14 days	Excellent
4	Shepherd-type	Castrated Male	Inflammed, discharge, ulcerative	Cleansed, 1% oint. applied for 2 days	Excellent

CHART 2. Neo-Cortef Ointment in Canine Eczema

Age	Breed	Sex	Appearance	Procedure	Results
4½ yr.	Spaniel	M	Inflammed, infected, moist. Resistant to treatment for 8 mo.	Cleansed, 2.5% oint. applied for 14 days	Excellent
7 yr.	Eng. Bull	F	Infected eczema under tail	Cleansed, 1% oint. applied for 14 days	Good
9 mo.	Irish Setter	M	Moist eczema of ear. Eroded almost to cartilage	Cleansed, oint. applied for 4 days	Spectacular recovery

blown areas of necrosis. This was due to the conformation of the tail, which so tightly covered the anus that during defecation some feces were forced into the area. This could be corrected usually only by surgical removal of the tail. However, to prevent severe sepsis, the area had to be cleansed prior to surgery. The animal was anesthesized, the area thoroughly cleaned and packed with ointment. This was followed by daily applications. Results were gratifying. Surgery was accomplished on the fifth day, and the surgical site was packed with the preparation. Recovery was normal, with apparent healing by the 14th day. Examination at six months proved recovery to be complete.

Traumatic Conditions

Use of the ointment in bite wounds, paw lacerations, and feline abscesses has been of extreme value. These conditions are refractory due not only to their contaminated nature and extent of tissue destruction, but to the usual delay in presenting cases for treatment. Cellular regeneration usually is retarded.

Debridement and proper cleansing is always necessary. Wounds that could be sutured were packed with the ointment prior to apposing tissues. Bandaging often was necessary on pad wounds, but generally was not performed in other conditions. Chart 3 summarizes a variety of these cases.

Summary

A neomycin-hydrocortisone ointment (neocortef) was applied in various ear, skin, and infected wound conditions of dogs and cats. In the cited cases, infection and inflammation were adequately controlled, pruritus reduced, and healing enhanced. The preparation warrants further investigation in the field of animal medicine.

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CHART 3. Neo-Cortef Ointment in Traumatic Wounds of Dogs and Cats

Breed	Sex	Age yr.	Appearance	Procedures	Results
Terrier	M	3	Multiple, old, infected bite-wounds	Debridement, 1% oint. applied, suturing. Systemic penicillin	Excellent. Rapid healing.
Cat	Castrated Male	1	Lacerated, swollen, infected foot. Present 10 days	1% oint. packed around toes	Excellent. Healed in 6 days.
Terrier	F	1	2½ in., infected bite-wound. Present 5 days.	Debridement, 1% oint. applied, sutured. Systemic penicillin	Excellent. Swelling gone in 2 days.
Toy Collie	M	1	Draining wound, bone exposed, due to chewing after amputation	Cleansed, oint. applied every other day	Excellent. No further bone involvement. Complete healing in 3 weeks.
Collie	F	1	Lacerated foot	Debridement, oint. applied, suturing	Excellent. No infection.
Maltese	F	1½	Infected bite-wound at base of tail	Debridement, oint. applied. Systemic penicillin	Excellent. Abscess healing well in 3 days.

Studies by Electron Microscopy of Newcastle Disease Virus After Propagation in Young Cats

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Bang[1,2,3] and Cunha *et al.*[4] showed a predominance of tailed Newcastle disease virus forms from purified egg-adapted virus material after suspension in 0.07 to 0.15 molar sodium chloride. These tailed forms also were found in hamster-adapted, mouse-adapted, and monkey-adapted Newcastle disease virus (NDV) after culture in ten-day embryonated eggs by Reagan *et al.*[5,6]. The tail-like structures were also demonstrated after intracerebral passage in the cave bat (*Myotus lucifugus*) by Reagan[7].

The Newcastle disease virus employed in this study was the 29th egg passage of the California strain. The virus was obtained originally from the Bureau of Animal Industry, Department of Agriculture, Washington, D. C. It had been passaged 28 times by the Bureau in embryonated chicken eggs and was carried one additional time at this laboratory.

Materials and Methods

Three young cats (two-weeks of age) were intracerebrally inoculated with 0.06 ml. of the allantoic fluid from the 29th subculture of the California strain NDV. Within 48-72 hours, the kittens showed typical Newcastle disease symptoms: Irritability, malaise, conjunctivitis, partial loss of muscle control, rigidity and pulsations of the tail, and a muscular jerking similar to that observed in infected chickens. When the described nervous symptoms developed in the cats, their brains were aseptically removed, ground with alundum, and diluted to a 10% suspension with physiological saline. This virus-bearing material was inoculated into the allantoic sac of 12 ten-day embryonated chicken eggs. All of the embryos died within 72 hours. A pool of the infected allantoic fluid from the dead eggs was prepared and the presence of virus was demonstrated and verified as that of NDV by a neutralization test using embryonated chicken eggs as the test host.

The virus-bearing allantoic fluid was centrifuged for five minutes at 1000 r.p.m. in a horizontal centrifuge. The sediment was discarded, and the supernatant was recentrifuged for one hour at 44,000 r.p.m. in a Spinco ultracentrifuge. There was less than a one-degree change in temperature of the refrigerated outer jacket. The sediment was resuspended with 3% physiological saline for five minutes, placed on parlodion-prepared screens, shadowed with chromium[8,9,10] at arc tangent 2/12 and examined under the R.C.A. EMU electron microscope.

Newcastle disease virus from the brain of an infected cat after one subculture in embryonated eggs. Shadowed with chromium at arc tangent 2/12. x 95,000.

Results

Various fields chosen for electron microscopic examination revealed many virus particles with uniform tail structure. Accompanying figure shows typical tail forms from the first cat passage after virus cultivation in embryonated eggs. These tails appear to be segmented. The high magnification brings out detail in these virus studies. These tailed-forms are morphologically similar to those previously described.

Summary

Three two-week-old kittens were inoculated intracerebrally, with 0.06 ml. of allanto-amniotic fluid from the 29th egg passage of the California strain of Newcastle disease virus. Forty-eight to 72 hours postinoculation the three kittens evidenced severe Newcastle disease symptoms comparable to those observed in infected chickens. The kittens were sacrificed, their brains were aseptically removed, pooled, ground with alundum and made into a 10% suspension with physiological saline. This virus-bearing brain suspension was then inoculated into ten-day embryonated chicken eggs. Within 48 hours all the eggs were dead and the allanto-amniotic fluid was collected,

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pooled, and prepared for electron microscopy study. A portion of this collected fluid was used for a neutralization test with embryonated eggs as the test host. This procedure verified the agent to be NDV.

Electron micrographs revealed typical tail-forms from the cat passage after virus cultivation in embryonated eggs. These tails appear to be segmented. The higher magnification revealed more detail. These tailed-forms are morphologically similar to those[1-5] previously described.

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Osteoma of the Zygomatic Process of the Temporal Bone in a Boxer

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On August 30, 1954, a five-month-old male Boxer was presented with a history of being unable to open its mouth. It was impossible to open the lower mandible more than ¼ inch. A spot diagnosis of postorbital abscess was made which later proved to be erroneous. Consultation with neighboring practitioners, and study of a number of radiographs suggested mechanical interference. The patient and *x*-ray films were taken to Alabama Polytechnic Institute for consultation. At this time, it was concluded that a tumorous mass having the relative density of bone protruded from the zygomatic process of the temporal bone (left) and was enlarged in such a way as to completely lock and immobilize the coronoid process and masseteric fossa of the lower mandible.

Corrective Surgery

With the patient anesthetized and the area cleaned thoroughly, an incision was made medially and completely across the enlarged mass of bone tumor. With a tooth elevator a small opening was worked into, up, and under the zygomatic process of the malar bone and between the zygomatic process of the temporal bone. After a bit of chiseling, the tumorous mass began to break loose. From this point, the tumor was removed in pieces about the size of a field pea. As each boney piece was removed, the lower jaw could be opened wider. The zygomatic process of the malar bone, along with the coronoid process and masseteric fossa, were scraped thoroughly. Muscles were sutured with interrupted sutures using 00 chromic catgut and the skin closed with 0 dermal suture. A mouth speculum was placed in the patient's mouth and left open until consciousness was regained. Immediately after the speculum was removed, the patient was able to flex his lower jaw and drink water.

Aftercare

The dog was sent home the day following surgery with instructions to the owner to feed some large bones, preferably large enough to stimulate exercise and stretch muscles of the jaw. The owner was also instructed to flex or jerk the mouth as wide open as possible three or four times a day. Ten days after surgery, the patient was again anesthetized and a speculum adjusted to effect extreme flexion of the jaws which removed what adhesions had begun to set up. Again the mouth speculum was left in place holding the jaw wide open until the patient was conscious. Approximately a month has passed and the dog has gained considerable weight, has normal function and is able to eat and drink.

Pathology

Sections of the bony specimens removed revealed no definite evidence of malignancy. Diagnosis: Osteoma*.

*Pathology Department, Alabama Polytechnic Institute, Auburn, Alabama. Case #8329.

Hepatic Toxoplasmosis in a Pel's Fishing Owl

JAMES R. WADSWORTH*, V.M.D., M. S., and FAHRI HAKIOGLU**, D.V.M., Ph.D.

Toxoplasmosis represents a protozoan infection of mammals, birds, and reptiles. Toxoplasma bodies occur in the blood cells within the lymphocytes and mononuclear leucocytes. They are likewise found within the cytoplasm of the parenchymal cells of the liver, adrenals, lung, and brain[3]. Known hosts include the African gondi, rabbits, dogs, guinea pigs, pigeons, certain wild birds (including canaries), and man[2]. Sabin[2] successfully transmitted Toxoplasma to chicks. Erichsen[4] reported a Toxoplasma infection in a flock of chickens in Norway, which was confirmed by histopathological studies. Lesions included peri- and myocarditis, encephalitis, and an ulcerating gastroenteritis. Wolfson[5] transmitted a guinea pig strain of toxoplasmosis to canaries,

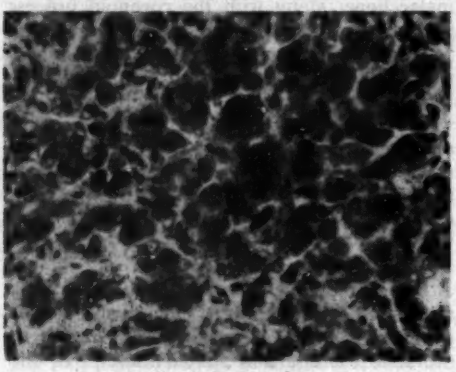

Fig. 1. Low power

young ducks, and to duck embryos, producing the disease as well as death in most of the birds. A Toxoplasma-like protozoan has been found in wild birds. Herman[6] found the organism in the blood of the Kingbird, Catbird, Starling, English Sparrow, Baltimore Oriole, Cowbird, Red-eyed Towhee, Swamp Sparrow and Song Sparrow.

Several months ago, Dr. Patricia O'Connor, veterinarian at the Staten Island Zoo, submitted the heart and liver from a 19-year-old Pel's fishing owl. The heart appeared grossly normal. Microstudies revealed scattered areas

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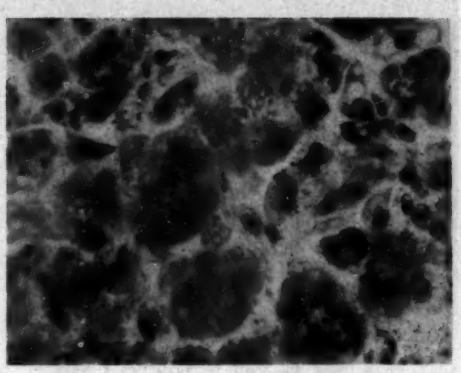

Fig. 2. High power

of myocardial hemorrhages with one massive area of hemorrhage between the pericardium and myocardium. This finding was called hemoepicardium.

The liver was somewhat swollen and had an unusual brownish, clay color. Histopathological examination revealed minute, intracellular, ovoid bodies widely distributed throughout the hepatic cells (fig. 1 and 2). The organism occured both singly as well as in compact masses. Although transmission studies were impossible without fresh material, a diagnosis of toxoplasmosis of the liver was submitted.

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Bat Rabies

Rabies was established recently in a brown bat *(Eptesicus fuscus pallidus)* captured in Montana. Negri bodies were identified in the bat brain, in mice that died after inoculation of bat brain emulsion, and in subsequent passage mice. No cases of canine rabies have been reported within several hundred miles of Hamilton this past year. —*Natl. Off. Vital Statistics, U. S. Pub. Hlth. Serv.*

(Continued from page 20)

sponsibility as disease control specialist.

Commenting on recent research developments, it was noted that foot-and-mouth disease virus has been propagated successfully in day-old chicks. In this unnatural host there is produced gross lesions and virus concentration in muscles of the gizzard. Modification has occurred after 20 passages, such virus being incapable of producing lesions in guinea pigs. A simple method of diagnosis also is being given extensive trial. Work at the new Plum Island installation is now proceeding and is expected to be a vital link in our defense against threatening diseases.

Vesicular stomatitis and vesicular exanthema pose problems inseparable from foot-and-mouth disease. The etiology of each is a distinct virus, either of which produces indistinguishable symptoms. Vesicular stomatitis may attack cattle, horses, and swine. Incidence appears to be more wide-spread than fragmentary reports indicate. The Committee urged special attention of officials in relation to all factors concerned with this dangerous entity.

Progress toward universal requirement of adequate cooking of garbage, before it is fed swine, highlighted comments concerning vesicular exanthema. For September 1954, 83% of 12,500 premises feeding garbage have installed cooking procedures. Methods and premises are receiving better inspection service. Properly conducted garbage cooking and restrictions of movement of raw-garbage fed swine promises eventual eradication of vesicular exanthema and a reduction in the incidence of trichinosis.

PARASITIC DISEASES

Report by Benjamin Schwartz, A.B., A.M., Ph. D., Chief, Zoological Division, USDA, Washington, D. C.

During recent years, instances of frank outbreaks of disease caused by parasites, and characterized by severe morbidity and mortality have been recorded. Though such cases appear to be on the increase in all classes of livestock, even more importance is attached to the unspectacular, insidious losses caused by parasitic marauders. They occur practically everywhere. Few animals are ever entirely parasite free. Losses incurred are seldom apparent to growers and there is no way in which to assess exact valuation on their cost to livestockmen and the nation.

The Committee referred to that portion of the book, Losses in Agriculture, published recently by the USDA (see VETERINARY MEDICINE 49:395 [Sept.], 1954). The total annual loss due to internal parasites is estimated at $430,000,000. and to arthropod, external parasites of $500,000,000. or a total of nearly $1,000,000,000., an astounding figure. It was then further pointed out that, in the opinion of this Committee, the loss, if anything, is underestimated.

The losses suffered due to parasites emphasize the importance of control. Much can be gained by improvement of management practices on the average farm. The problems are under continuous study and drugs having greater efficacy are being made available. So intensive is research that much new knowledge of vulnerable stages of life cycles of parasites and drugs for attack by improved technic is eminent.

Orchard spraying equipment with high pressure hose and trigger-operated spray gun may be used for treatment of external parasites in all classes of farm animals.

BIOLOGICALS AND PHARMACEUTICALS

Report by Mark F. Welsh, D.V.M., Animal Industry Consultant, Lederle Laboratories Division, American Cyanamid Co., Pearl River, New York.

Data presented at the federal hearing held in Washington in July 1954, emphasized the importance of swine culture in American agriculture. Excerpts of matters of interest were included in this report as follows:

1. Swine Production.
   On 62% of all farms in the United States.
   On 72% of all farms in the North Central states.
   On 85% of Iowa farms.
2. Income from swine production is 10 to 12% of the national farm income.
3. Cash receipts from sale of hogs.
   $3,901,767,000. in 1951.
   $3,517,110,000. in 1952.
4. Hogs slaughtered in 1953.
   77,690,100 sold
   9,022·000 on farms

   86,712,100 total
5. Pork consumption.
   67 to 70 lb. — annually, per capita.
   50% of total meat consumed.
6. Provides greatest outlet for farm-raised grains.

It was noted that during the past five years a larger percentage of hogs was vaccinated than in any previous period. In 1953, 55.3% of total produced were immunized against hog cholera. Use of the new vacicnes has increased four times since 1950. Over 19,000,000 animals were so protected in 1953. Reports reveal the trend toward modified live-virus vaccination procedures and sufficient time has elapsed to prove their value and limitations. So convincing a mass of evidence is available that the Committee recommended that federal and state officials again review and restrict, or outlaw, promiscuous distribution or manufacture of simultaneous hog cholera virus. Experience reported in states which now prohibit its use is favorable.

New Vaccination Technics

Introduction of mass vaccination technics sets precedents which require study as to their desirability. Three new forms of Newcastle disease vaccines were introduced during 1954. In one of these, a modified live virus is simply added to the drinking water, another is absorbed on dust of standard, particle size, and a third is administered as a mist or spray. Greater losses are suffered by such mass vaccination procedures but are becoming acceptable not alone because immunity induced is adequate, but savings in time and labor offset losses. Some of these products (aerosols) combine virus vaccines (Newcastle disease-infectious bronchitis) after their separate cultivation.

Noted were hazards in the practice of allowing unlicensed vaccines to be sold in the state in which produced. Such practice serves as an open invitation for expansion so long as it is allowed. Corrective action was recommended strongly before serious losses result.

Brucellosis

Concurrence in the recommendation made last year that only desiccated *Brucella abortus* vaccine strain 19 may be used in the vaccination of cattle for brucellosis, was expressed.

Trends in Research

Most fruitful research has come in recent months, and can be expected in years to come in the fields of hormone-enzyme therapy, chemotherapeutic agents, combined antibiotics, mass vaccination, and anthelmintics. Gains in some fields have been profound to spectacular; in others no major contributions are recorded for the year. Such old problems as anaplasmosis, trichomoniasis, keratitis, vibriosis, infectious atrophic rhinitis, infection pododermatitis, and leucosis continue to plague livestockmen. All agencies are encouraged to continue studies on these chronic, but costly, diseases.

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Faulty mechanical operation and improper use of milking machines is the most common and frequent cause of mastitis.—*H. G. Hodges, D.V.M.*

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Every country of the world envies the position of the United States as regards foot-and-mouth disease.

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Losses among feeder cattle due to the shipping fever complex are becoming more and more serious.

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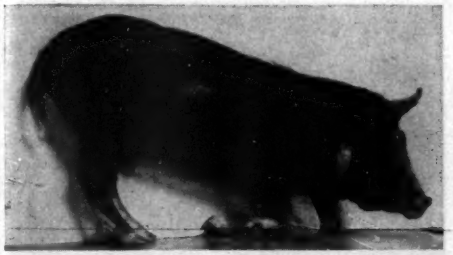
No hog cholera simultaneous virus has been used in Alabama since 1951; nor is it intended, at the present time, to relax restrictions on its sale.

Field Use Of An Adsorbed Swine Erysipelas Bacterin

H. P. CALLAWAY,† D.V.M., R. S. CLARK,†† D.V.M.,
L. W. PRICE,* D.V.M., and S. A. VEZEY,* D.V.M.

IN the United States, vaccination of swine using live culture of *Erysipelothrix rhusiopathiae* and hyperimmune serum has been practiced since 1938 under restricted conditions. Results have proved that the procedure is of value in checking disease outbreaks. It has serious limitations which have been recognized. The use of live, virulent culture in itself may be the source of continuing infection, and there exists the danger of seeding



Note joint lesions; characteristic of swine erysipelas.

premises which thus become the source of infection in susceptible pigs. The development in Europe[1,2] of an immunizing agent containing no living organisms and highly successful results obtained following its use, stimulated interest in evaluation of similar preparations under swine management conditions as practiced in the Cornbelt.

This reports results of routine clinical use of an adsorbed erysipelas bacterin** in 9,210 swine on farms in five midwestern states on which postvaccination observation was made. The bacterin is prepared from three highly antigenic strains§ of *E. rhusiopathiae* isolated by Dinter in Germany, using essentially the same production technics employed by the German workers[3]. It is pertinent to note here that the antigenicity of the bacterin is determined by mouse challenge test, whereas no satisfactory routine laboratory test for antigenicity has been devised for live culture vaccine. While valid comparisons of two methods of vaccination can be made only under identical experimental conditions, wide field use provides valuable information of the efficacy of immunizing agents.

Field Use

Herds observed were located in Missouri, Illinois, Nebraska, Minnesota, and Iowa, and were vaccinated between October 1953 and May 1954. Animals were observed to the age of six months for market hogs, and for six months postvaccination for breeding stock. This report includes observation on the influence of vaccination of pregnant sows shortly before parturition to determine incidence of disease in baby pigs. Farms selected had experienced unusually severe losses in baby pigs during the first two weeks of life. Pigs from vaccinated sows were subsequently vaccinated with erysipelas bacterin at approximately four to six weeks of age. All pigs were average farm animals and were grain-fed. The majority were vaccinated before, or shortly after, weaning, but pigs from three to 12 months of age were included.

History of all droves indicated that swine erysipelas had been a problem for many years. The expected mortality was stated to be 2 to 80%; the majority, however, was in the 5 to 10% range. Frequently, diagnosis was confirmed by isolation of *E. rhusiopathiae*. Development of enlarged joints and stiffness usually occurred in 5 to 20% of the affected animals. In some herds, the incidence of erysipelas in new-born pigs was high; from one third to one half of the pigs were lost in the first three weeks, necessitating the routine administration of antiserum within 24 hours of birth.

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†Practitioner — Waverly, Mo.
††Practitioner — Waverly, Mo.
*Lederle Laboratories Division, Pearl River, N. Y.
**Duovax® Erysipelas Bacterin, Lederle Laboratories Division, American Cyanamid Company, Pearl River, N. Y.
§Although many strains of *E. rhusiopathiae* were tested, only a few proved sufficiently antigenic.

Swine erysipelas in a shote. Note enlargement of right carpus.

In most of these droves, vaccination with serum and culture had been practiced with results varying from unsatisfactory to good. In the remainder, antiserum was used routinely together with penicillin, in some cases on a treatment basis, with fair results reported if given early. In many instances, in order to get pigs to market age without active infection, administration of serum, or serum and culture, was repeated every 60 days. Results of these procedures left much to be desired.

Vaccination

A single dose of 5 cc. of erysipelas bacterin was administered subcutaneously either in the flank, posterior to the elbow, or behind the ear. A total of 297 received a second injection from four days to three weeks later. A dose of 2.5 to 3.0 cc. was administered to all pigs under four weeks of age. Hog cholera immunization was performed simultaeously with erysipelas vaccination in 385 pigs, although this is not a recommended procedure, using a modified, live virus vaccine in 190 and serum and virus in 195. In some few animals, where the condition of the herd was generally unthrifty and obviously parasitized, erysipelas antiserum was administered simultaneously with bacterin.

Results

No losses from erysipelas have been reported in animals vaccinated in this trial, whereas reported incidence of erysipelas was high in some of the localities where these droves were located. While occasionally, slight stiffness and lameness was observed in some pigs several weeks postvaccination, these symptoms resolved themselves rapidly, and pigs finished out in the feed lot satisfactorily. Development of enlarged joints and lameness previously seen with other methods ceased to be a problem. Although the numbers of animals involved were small, and no definite conclusions can be drawn at this time, neither simultaneous use of erysipelas antiserum nor hog cholera immunization appeared to have any effect on the efficacy of the erysipelas vaccination in the trials reported here.

A local swelling at the site of injection has been reported. In most instances, this has not been serious and has disappeared entirely within three to six weeks. Owners had no serious objections to these, particularly when such animals grew to market age with no signs of clinical erysipelas. Occasionally, however, particularly in older swine, this local reaction persisted for several months. Vigorous shaking of the vial before use and during vaccination is recommended to avoid postvaccinal swelling. This is important because most of the antigenic component is bound to the contained alum.

Gangrene of snout and ears, caused by Erysipelas

Effect of Vaccination on Pigs Exposed to Clinical Erysipelas and to Pigs Vaccinated with Serum and Culture

On one farm in Iowa, a drove of about 150 pigs had suffered a loss from erysipelas of 105 pigs in 1951. In 1952, serum and culture were administered but an outbreak occurred in the fall of that year. On November 30, 1953, 33 ten-week-old pigs were inoculated with

one dose of erysipelas bacterin, subcutaneously, posterior to the elbow, and were returned to the main drove where some infection was present. Pigs farrowed in the spring of 1954 exhibited symptoms even though serum and culture were administered at three days of age, and six died of clinical erysipelas. However, the 33 pigs vaccinated with bacterin in November 1953, which were maintained constantly in contact with those naturally infected and those vaccinated with live culture, exhibited no symptoms of illness to market age.

Effect of Vaccination of Sows in Late Pregnancy on New-Born Pigs

In three droves, where one-third to one-half litter death loss has, for some years, been experienced in new-born pigs during the first three weeks, 46 bred sows were vaccinated about three weeks before parturition. All farrowed normally, averaging seven pigs per litter. At four weeks of age, pigs were injected with 3 cc. erysipelas bacterin. No clinical symptoms of erysipelas developed in any of these pigs to market age.

Comment

Field use of any product without untreated or unvaccinated controls gives only presumptive evidence of its efficacy. The results of such use may be considered significant if good protection is demonstrated as compared with the experience in previous years, particularly in large numbers of swine on numerous farms in a widespread area.

This report is preliminary and covers only a relatively short period — October 1953 to May 1954. However, within that time, many litters of pigs have been raised and marketed without complications from erysipelas formerly experienced. On all premises, erysipelas had been a problem for many years, and while live culture vaccination or treatment programs were routine, results left much to be desired. While varied reports have appeared on determination of the duration of immunity following bacterin administration in the laboratory against experimental challenge, results in the field appear encouraging. Revaccination at six months of age is recommended for breeding stock.

Acknowledgment

The authors wish to express their appreciation to Mrs. D. Budd for assistance in the preparation of the manuscript.

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Ralston Purina Company Research Fellowship Awards

The Ralston Purina Company has announced its Research Fellowship Awards program for 1955-56, under which ten outstanding agriculture college students will be able to do graduate work. Application blanks and rules of the annual program are now being sent to agriculture colleges throughout the United States and Canada.

Selection of the ten winning students will be made, as in the past, by a committee of five, composed of a representative from the Poultry Science Association, the American Veterinary Medical Association· the American Dairy Association, the American Society of Animal Production, and the Association of Land Grant Colleges. Three Fellowships will be awarded in animal husbandry, three in dairy husbandry, three in poultry husbandry, and one in veterinary science. Each Fellowship amounts to $1,560.

The purpose of the program is to help train outstanding college students for leadership in the science of livestock and poultry production. The first Fellowships were granted for the 1949-50 school year. Among the 21 outstanding college students who have been chosen for Purina Fellowship awards during the past five years, 15 are now professors in colleges of agriculture, and one has become the head of his department.

Application blanks for the Fellowship Awards may be obtained by writing the Ralston Purina Research Awards Committee, % Mr. J. D. Dykes, Ralston Purina Co., St. Louis 2, Missouri.

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Swine are highly susceptible to the virus of vesicular stomatitis, vesicular exanthema, and foot-and-mouth disease. Each may be spread by contact.

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Fewer susceptible animals may account for the decreased incidence of foot-and-mouth disease in Europe.

PRINCIPLES OF ANIMAL HEALTH

R. R. DYKSTRA, D.V.M.
Manhattan, Kansas

Equine Practice Suggestions

During attendance at the sessions of the Mississippi Valley Veterinary Association October 27-28, we picked up several excellent practical points. For example, Dr. Isaac E. Hayes, Waterloo, Iowa, an outstanding practitioner of equine medicine and surgery stated: 1. He hesitates to resort to caudal anesthesia in horses as it may make the patient go half way down and thus injure a stifle. 2. Purely from the standpoint of ethics, he will not perform a neurectomy on an animal handled by traders. 3. Anesthesia for laryngeal paraplegia consists in first anesthetizing the mucous membranes of the saccules; then, after the removal of the mucous membrane, anesthetizing the resulting raw surfaces. 4. In the diagnosis of suspected "roaring", first tie down the animal's tongue, and if this controls the inspiratory dyspnea, the animal does not have laryngeal hemiplegia or paraplegia; rather the inspiratory sound is produced as the result of a conflict between the tongue and the soft palate. 5. Apomorphine, 1/5 gr. and morphine sulfate, 3 gr. subcutaneously administered will, in many instances, relieve oesophageal "choke" without resorting to additional measures. 6. In the handling of coprastasis, the use of oils is preferred over salines as the latter exerts too great a dehydrating effect. Neither are injectables used if flatulence is present. One-half grain of atropine sulphate, plus mineral oil is an excellent sedative in colic. However, there are problem cases, in some, constipation changes to a serious diarrhea following treatment.

If there are errors in the preceding, the fault is in the writer's reporting and not to be ascribed to Doctor Hayes.

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For the purpose of possible organization of a short, refresher course and improving position for veterinary, professional licensure for European, graduate veterinarians admitted here under DP-Act of Congress 1948, please contact Committee of Newcomer Veterinarians, Dr. M. Samuchin, 1356 W. Hubbard St. Chicago 22, Illinois. It is desirable to indicate year and school of graduation, also present occupation.

Practices Found Helpful in Mastitis Control

In *Science For The Farmer*, Vol. II, No. 2, Fall 1954, issued by Pennsylvania State University, there is an article by bacteriologist Reid entitled, Mastitis Control. The article is based on the ten-year program of observation and research. In the heading, Practices Found Helpful in Mastitis Control, are listed, among other items, the following:

1. Removal of susceptible blood lines since tendencies toward mastitis evidently are heriditary.

2. Prevention of exposure to low temperatures and cold winds out of doors, and drafts in stables. Cows should not assume recumbency on cold ground, bare concrete floors, or rough surfaces.

3. Awareness of potential danger in injury to the teats and udder.

4. Careful, interested dairy-barn helpers, milking equipment kept in good order, reasonable feeding of concentrates, and special care during drying and at calving time, and immediately after calving.

Under the heading, Practices of Doubtful Value in Mastitis Control, the following are noted:

1. Rigid sanitary regulations, other than for the production of sanitary milk, have not been demonstrated to be of practical value in herd management.

2. Laboratory examination of carefully drawn milk, and classification of cows on the basis of such findings.

3. Elimination or segregation of old shedders of *Streptococcus agalactia*.

4. Placing non-mastitic animals at the head of the milking line, cleansing of stalls and gutters with disinfectants daily, use of bactericides on udder and teats before milking, and the application of a disinfectant to teat cups each time before use, though apparently based on sound reasoning, have brought only slight, if any, relief even when rigidly enforced.

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Bone is living tissue.

EDITORIAL COMMENTS

Review of Progress in Veterinary Medicine — 1954

Progress in veterinary medicine during 1954 was characterized by the interest manifested by all segments of the profession in fact-finding research. Recent studies have disclosed some basic facts and continuing investigation is certain to reveal more information about better ways and means of dealing with problems posed by diseases that attack animals.

Federal and state funds have been made available to veterinary colleges and established experiment stations for basic research. Organized veterinary groups, other groups allied with the livestock industry, and manufacturers of veterinary biologicals, pharmaceuticals, and supplies also have set aside large sums for support of private research or for grants in aid. In some instances, substantial proportions of profits or surplus have been spent for purposes of developing new and more effective prophylactic and therapeutic agents.

Many factors have stimulated and continue to emphasize the need for more facts, not the least of which is the past summer's official announcement of appalling losses suffered by the livestock industry for each of the past ten years. The livestockman is not the only loser when ravages of disease and parasites take their toll in meat and meat products he produces. It is also a loss to the nation's health and wealth. Losses attributable to morbid charges are difficult, if not impossible, to estimate accurately but are known to be significant. These are usually hidden so that growers are unaware of their extent. It is a simple matter to count mortality as a percentage of the livestock crop lost through death, and quite another to evaluate losses suffered in growth, gain, and quality deterioration occasioned by even mild parasitic loads.

There is tremendous potential for professional service to the livestock industry. Losses due to new disease entities and some old ones are challenging the best efforts of the profession whose members must be informed and up-to-date to cope adequately with the microbes that make hazardous profitable production of meat and meat products.

Brucellosis

The importance of the recommendation of one group of researchers that the interpretation of the blood agglutination test be revised for calf-vaccinated cows holds great promise for cattlemen and dairymen. Coming as it does on the eve of requirements by some markets for milk only from Brucella-free herds, universal adoption of these recommendations may assure an adequate fluid milk supply otherwise endangered. The United States Department of Agriculture already has taken action by accepting recommendations for liberalizing interpretation of the serum agglutination test for vaccinated cows. In closely coordinated action, some state officials also are amending local regulations for conformity with USDA proposals. This is a major step in bovine brucellosis control.

A Very Merry Christmas
and a
Prosperous New Year

to all our subscribers and friends

Editor and Staff
VETERINARY MEDICINE

Vesicular Disease

The threat of foot-and-mouth disease was lessened during 1954. The second outbreak in Mexico, occurring in 1953, was confined within a relatively small area. Infection has been stamped out, and unless disease recurs, which appears unlikely, the international border between the United States and Mexico will be opened again on December 31, 1954 for the movement of livestock and their products. Incidence of foot-and-mouth disease also was reported to be less in 1954 from all parts of the world where the disease is endemic.

Vesicular exanthema in swine, a grave threat to the industry in 1952, now has been reduced to manageable proportions. Infection now exists in only a limited number of counties on the West Coast and on the Atlantic seaboard. Garbage cooking laws and restric-

tions of movement of animals from quarantined areas have been the means of preventing further outbreaks. Modern equipment for processing municipal garbage has been designed and installed in many cities. This system for disposal has solved an acute problem that has concerned public health authorities and sanitary personnel and has made possible disposal safely, on one hand, and utilization of what might otherwise be completely wasted, on the other. Returns from municipal-operated swine feeding operations are already offsetting cost of collection and processing and are expected to return profits in addition to having distinct public health advantages. In this, a major step has been taken for control of several common swine diseases, including trichinosis, which is transmissible to man.

Drug Development

There has been developed, during the past year, new prophylactic agents within the classification of biologicals, antibiotics, hormones, and enzymes. Many less spectacular drugs and combinations also have been made available. All of these agents are improvements and have certain advantages over those previously recommended.

Research in, and development of, new products and production methods have, in some instances, paced advances in biological production. Field experience is demonstrating greater efficacy and safety of new prophylactic agents.

Natural and synthetic hormones and enzymes made front-page news in 1954. New uses have been revealed for some of these that promise growers a larger and improved quality of product per unit. It remains for extensive field use to establish their value.

No abatement in the development of new agents or new uses is in prospect, and intensive research is progressing along multiple channels. All of these efforts are directed toward the conservation of wholesome meat and protein food that contributes so largely to robust health.

Education

Facilities have been built, or improved and enlarged, at all of the veterinary schools that have opened since the close of World War II. Additional modern buildings and equipment have been built and put into use at many of the old ones. The New York State Veterinary College now has an entirely new school under construction. Estimated cost of this project will exceed $5,000,000. Training of veterinarians in the United States generally has attained new heights and is in good hands. Graduates are better prepared than ever before to render a standard of professional service the livestock industry expects and deserves.

In the foregoing, assurances are evident that activities in the field of veterinary science can be expected to limit incidence of diseases of livestock including those transmissible to man. Aggressive research efforts will continue to provide needed safeguards.

Survey of Veterinary Drug Needs

A comprehensive survey conducted by members of the Veterinary Medical Division, The Upjohn Co., Kalamazoo, Michigan, is summarized in a mimeographed detail tabulating answers to questions posed concerning most needed information regarding animal diseases, and drugs for their treatment and control, the concluding statements of which are quoted:

"Leading veterinary authorities throughout the United States were contacted concerning (1) Drugs most needed by the veterinary profession, and (2) animal diseases most in need of effective therapeutic agents.

"1. This survey indicates primary interest in the cow, secondary interests in the dog, pig, and sheep, with increasing interest in poultry.

"2. Antiviral and antibiotic agents are frequently mentioned by those answering the survey.

"3. Diseases are classified under the headings (1) Viral, (2) bacterial, (3) parasitical, and (4) miscellaneous.

"Prime interest in viral diseases centers around chronic respiratory disease (CRD) of poultry, canine distemper, and canine infectious hepatitis.

"Bacterial diseases of primary importance were: Leptospirosis, brucellosis, bovine mastitis, and infectious enteritis of large animals.

"Parasitical diseases included anaplasmosis, coccidiosis, and trichomoniasis.

"Miscellaneous animal diseases of prime interest were: Bovine ketosis, infectious atrophic rhinitis of swine, pink-eye, infertility, and skin diseases of all species."

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Studies during recent years have revealed the astonishing wonders of the rumen of the cow. Possibly it should be listed among the top group of nature's marvels.

Progress in Vesicular Exanthema Eradication

The California State Department of Agriculture reports a steady increase in the number of California hog raisers who are cooking all garbage fed to hogs, in cooperation with the Department's program to prevent, control and eventually eradicate vesicular exanthema.

Vesicular exanthema has existed in California for more than a score of years. The Department takes the position that raw garbage is the largest single factor contributing to its spread and is cooperating with the federal department of agriculture in a quarantine program to require that all garbage fed to hogs be cooked to kill the virus.

On November 1, of 605 hog ranches in the state where garbage was fed, 453 had installed proper equipment and are now cooking the garbage. On 80 of the 605 ranches, the feeding of garbage has been discontinued.

As more and more ranches turn to garbage cooking, more counties of the state are subtracted from the list of counties under state and federal quarantine. As of December 1, 29 counties have been released from the dual quarantines and more are scheduled to be released on December 15.

Forty-three states now require that all garbage fed to hogs be cooked.

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Progress in Medicine

Evidence of progress in medicine is revealed in comparative mortality and morbidity reports of diseases that formerly took significant numbers of lives. In 1900, 250 to 275 persons of each 100,000 died of tuberculosis in the United States. In 1953, ten states recorded under five deaths per 100,000 population. Pneumonia was responsible for loss of 35 persons of each 100 stricken at the Cook County Hospital, Chicago in 1912; now, thanks to miracle drugs, only five die of each 100 who fall ill.—*from an address by Morris Fishbein, M. D.*

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Commercial broiler production in the United States for 1954 is estimated at approximately 1,000,000,000 birds.—*Am. Feed Mfr. Assn.*

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Intensive research into disease problems of today will assure their solution tomorrow.

Scrapie in Sheep

Scrapie is a chronic, infectious, nervous disease of sheep. Though known to exist in Great Britian and Germany for 200 years, and in France for 100 years, its first occurrence in North America was recorded in Canada in 1939 in a Suffolk ewe imported from Scotland a few months earlier. It was identified in the United States in 1947 among animals imported from Canada which had been shipped from England in 1942. Scrapie also has been identified in New Zealand and Australia since 1951, in each instance among sheep of British origin. Diseased animals were slaughtered promptly in both New Zealand and Australia.

The disease is believed to be viral. Affected animals usually perish. No effective prophylactic or treatment agents have been found. By now it has appeared in seven states. All known infected and exposed animals have been slaughtered, largely through measures of a federal-state eradication program. Since its first appearance here, a total of 2,152 sheep in 15 infected flocks in 14 counties have been destroyed. In addition, some 576 flocks in 39 states are under surveillance for evidence of infection.

The problem posed for control is created by the exceptionally long inoculation period, which is normally from 18 to 36 months or more. It is difficult, if not impossible to determine when and if it has been eradicated. It must be considered as a continuing menace. Cooperation of sheep growers is necessary for prompt recognition of symptoms and reporting outbreaks to proper authorities. The USDA has endeavored to fit regulations, in recent changes, to allow wider participation by the federal government in paying indemnities for condemned animals.—*from Scrapie—A Disease of Sheep, ARS 22-3, Sept. 1954.*

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Parthenogensis, a modification of sexual reproduction in which the organism develops from infertile eggs is under study at Beltsville, Md. A small flock of Beltsville White turkey hens have produced parthenogenetic eggs, embryos from which have lived only for a period of 26 to 27 days. None have hatched to date.

The matter is of particular interest to hatcherymen who have found a discouragingly large number of fertile-looking eggs that never hatch. Inheritance studies are progressing toward breeding out the tendency to produce parthenogenetic eggs.

Dean Clark in Good Health

Reports of the serious illness of Dean Chester F. Clark, Michigan State College, East Lansing, have been greatly exaggerated, according to information received from his office.

Dean Clark was subjected to minor surgery in October and again in November for removal of a superficial growth. Studies have removed fears of serious pathology. His general health is reported to be excellent.

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Dean H. W. Orr, School of Veterinary Medicine, Oklahoma A. and M. College, Stillwater, who suffered a myocardial infarction on September 8 is making satisfactory progress and complete recovery is predicted by his physicians. Friends of Dean Orr will be pleased to learn that he already has returned to his office for limited duties.

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Much experimental evidence is available concerning the influence of light exposure on sexual activity of animals. This appears to be a pituitary stimulus for production of regulating hormones. Species react differently to variations of light intensity. Regulation of light exposure is applied commercially in the production of eggs from chickens, ducks, turkeys, and pheasants. There appears to be a limited field for application of light effects on practical reproduction problems in some common farm animals.—*Nutrition News Bulletin.*

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The New Bolton Center, an important facility of the Pennsylvania School of Veterinary Medicine, was dedicated by appropriate ceremonies Oct. 16, 1954. Dr. Gaylord P. Harnwell, president of the University of Pennsylvania stated that the enlarged program for research made possible by these added facilities has attracted interest and support of individuals and organizations. It is in these quarters that the newly-organized Department of Preventive Medicine and Hygiene has been conducting investigation of infectious disease communicable to man.

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If it were not for lesions of edema observed in approximately 50% of pigs dead of enterotoxemia (gut edema), this disease closely resembles staggers in pigs.—*F. W. Schofield, D. V. M.*

Operating room at the State Hospital for Animals in Kozienice, Poland.

There has been less cholera and more erysipelas in Iowa swine herds during the past season.—*A. W. Krause, D.V.M.*

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POULTRY PRACTICE PROBLEMS

W. R. HINSHAW, D.V.M., Ph.D.
Frederick, Maryland

Prevention of Pullorum Disease

At least once a year I like to remind my readers that pullorum disease of chickens and turkeys is one disease that can be prevented. In fact there is little excuse for a poultryman to have losses in his flocks from this disease. The prophylactic procedure is simple. All one has to do is to always buy replacement stock from hatcheries which can guarantee that the chicks or poults sold by them have come from pullorum-free flocks. The best way to insure this is to recommend that your clients purchase replacements from hatcheries that sell only chicks or poults from U. S. Pullorum-Clean or U. S. Pullorum-Passed flocks. Lists of hatcheries which supply these grades of chicks and poults are available from state representatives of the National Poultry and Turkey Improvement Plans.

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Massachusetts Plan for Control of Fowl Typhoid

The University of Massachusetts, cooperating with the Massachusetts Division of Livestock Disease Control, has started an intensive fowl typhoid control program. It is based on a testing and slaughter procedure. Suspected flocks are tested by means of the agglutination test, reactors are removed and slaughtered and the premises are cleaned and disinfected. Repeated tests are made to insure the elimination of all carriers, or in lieu of this, the entire flock is slaughtered. The program is a cooperative one with the poultryman, but the Massachusetts Division of Livestock has the power to order testing of infected flocks and slaughter of reactors without payment of indemnity.

The regulatory action is used only after cooperative attempts fail, and according to Doctor Snoeyenbos (*Fetheredfax*, Apr. 23, 1954, p. 2) it has been used only once. The aim of the program is to determine the status of all questionable flocks as quickly as possible and to "clean-up" infected flocks as rapidly as is feasible. The program is based on the knowledge that all infected birds are a threat to the neighboring flocks as well as to the poultry industry as a whole. Indication of the success of the plan is seen by the reduction of the number of outbreaks since the plan has been in effect. In 1951, 40 acute flock infections were diagnosed; in 1952, 26 outbreaks were recorded and 11 additional infected flocks were suspected. In April 1954, at the time of Doctor Snoeyenbos' report, only four infected flocks were known in the state, and these were enrolled in the program.

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Visitors as Potential Disease Spreaders

A poultryman in Freehold, New Jersey has obtained an answer to the question, "How much poultry litter can be carried on a poultry-man's shoes"? According to *Everybody's Poultry Magazine* (Oct., 1954, p. 21), Isador Warshaw got the answer by placing a small metal box at each of two doorways leading into a poultry house and scraped the litter from his shoes into them each time he left the pens. Each week he collected and weighed the accumulated litter. At the end of a year he had about 2,600 lb. I will leave it to the statisticians to determine the possible number of coccidial oocysts that could be spread by the poultryman in this quantity of contaminated litter.

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Dubbing

Amputation of the combs and wattles (dubbing) of breeding males of the large-combed breeds such as the S. C. White Leghorns has become a standard practice in areas where freezing temperatures are prevalent. The purpose of dubbing is to protect the males from the possibility of frozen combs and wattles and subsequent loss in fertility. Extensive injury, edema, or infection of these appendages also indicate removal. Dr. Thomas W. Fox of the University of Massachusetts has observed that "dubbed" males suffer less from fighting damage, and that bossism is less. For the technic of amputation of combs and wattles, the reader is referred to Diseases of Poultry, by Biester and Schwarte, 3rd ed., page 1052.

ABSTRACTS OF LITERATURE

Streptomycin for Swine Dysentery

Mortality and weight losses caused by swine dysentery can be controlled by streptomycin, according to tests made on a total of 2,793 swine in eleven herds, all infected, to some degree, with dysentery[1]. The total death loss before streptomycin treatment was 152. After treatment only nine animals died. Equally important, the antibiotic therapy protected the pigs against any serious setback in growth. Dosages varied from 0.5 to 2.0 gm. of streptomycin per pig per day for two days, with an average of 0.7 gm. Best results, it was found, were obtained when the antibiotic was dissolved in the drinking water.

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Reduction of Ratio of Swine Erysipelas Culture to Serum Indicates Improved Immunological Response

Results of experiments conducted on weanling pigs at the Beltsville station indicated inconsistent immunity response to swine erysipelas culture and serum administered as recommended.

The authors[2] observed that narrowing the ratio of culture and serum injection in mice possibly induced a more satisfactory immunity response than that recommended for swine. At the present time, the prophylactic dose of culture for swine is 0.25 cc., and 5 cc. of anti-serum. This is a ratio of 1:20.

An experiment was set up to vaccinate selected pigs at weaning or from 56 to 61 days of age. They were normal, healthy animals weighing 30 to 45 lb. Simultaneous injection of culture (0.5 cc.) and antiserum (3 cc.) was made subcutaneously in the axillary spaces. This dosage ratio was determined to be 1:6.

Results are reported as surprisingly good. There was not only immunity of gratifying duration (five to seven months) induced but, during this period, there was marked absence of variation in reaction to challenge (cutaneous reaction) to four exposure strains of organisms. It may be seen that, percentage-wise, these experimental dosages were an increase of 100% of culture and a decrease of 40% antiserum.

The authors state that "No clinical manifestations were observed following the vaccination of the weanling pigs in this experiment. Nevertheless, the possibility of 'vaccination erysipelas' must be considered until a large number of swine have been vaccinated safely with the ratio of culture to serum used in this experiment. Therefore, before recommending any dosage change, it would require substantial evidence of safety, which can be obtained only from field use."

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Stilbestrol Implants Improve Gains in Feedlot Lambs

A group of 42 Columbia lambs were divided into three lots and handfed a full ration of shelled corn and alfalfa hay. Lot 1 lambs were treated with 12 mg. pellet implants of stilbestrol. Lambs in lot 2 received pellets containing 1,000 units of bacitracin. Lot 3 was held as controls.

After a feeding period of 70 days, the stilbestrol-treated lambs gained 19% faster, while the bacitracin-treated lambs gained no more than the controls.[3]

Greater gains revealed by stilbestrol-treated lambs was not due to increased feed consumption. Actually, feed required to produce 100 lb. of gain was $13.82 for lambs in lot 1, $18.26 for lot 2, and $16.43 for the control group.

Treatment had no effect on carcass grade and average dressing percentage differences were small. Some evidence appears to indicate that meat from treated lambs has a higher moisture content.

The Food and Drug Administration has not approved the use of stilbestrol for injection into animals to be slaughtered for human consumption. It is understood, however, that some feeders are following the practice. It is considered unlikely that such implantation of synthetic hormonal substance would be harmful if properly performed, especially if slaughter was delayed 30 days following treatment.

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Research must be aggressive—not defensive.

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[1]Doyle, L. P., Field Trials with Streptomycin for Dysentery, *Jour. Am. Vet. Med. Assn.*, 124:195 (May), 1954.

[2]Vaccination of Weanling Pigs Using a Change in the Dosage Relationship of Culture and Serum. *Jour. Am. Vet. Med. Assn.*, 125:306 (Oct.), 1954.

[3]Richard, R. M., and Dinusson, W. E., Effect of Stilbestrol and Bacitracin on Growing and Fattening Lambs. N. D. Agri. Exp. Stat., *Bimonthly Bul.* 16:86 (Jan.-Feb.), 1954.

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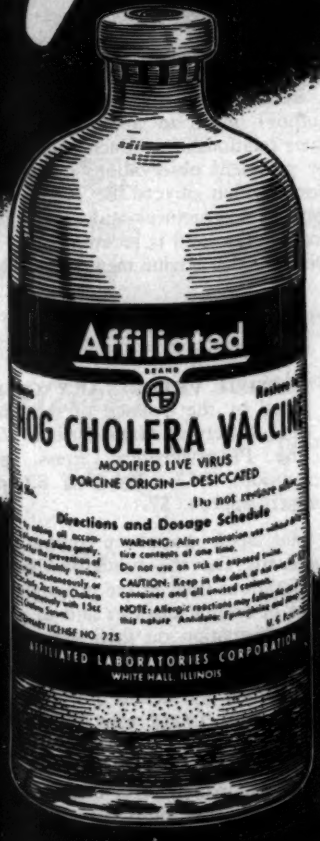

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BOOK REVIEWS

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MICROBIOLOGY OF MEATS by *Lloyd B. Jensen*, Ph. D., chief bacteriologist, Swift & Co., Chicago. 422 pages, 3rd ed. The Garrard Press, Champaign, Ill., publishers, 1954.—Price $6.

This book does not lie within the compass of pathology but deals exclusively with industrial microbiology of meat foods. It is recommended for all those interested in meat sanitation and inspection.

The ancient art of preserving meat existed even before laboratory aids or controls were remotely considered as necessary for guidance, standardization, and control of food processing. The story has grown with man's struggle for existence; a race between man and microbes for food. Earliest records of the archeologist reveal that food technology had its origin in prehistoric ages. Food preservation by oil was practiced in 3000 B.C. In the north of Europe and Asia, freezing and icing of flesh foods for preservation was practiced since time immemorial. Salt curing and smoking meat were employed in the time of Homer. Columbus was said to be motivated by a desire for spices with which to preserve foods. American Indians, of the western plains particularly, employed drying stripped buffalo muscle in the sun and wind (jerky) in order to preserve it for later use.

In the meat industry, the bacteriologist is a latecomer having been introduced into the industry about 1890. Today some meat laboratories are staffed with highly trained personnel numbering up to 250 scientists.

This book summarizes much research in the field it covers. It deals both with organisms harmful and useful in preservation and in acceptance of meat as a prime item of diet. It provides an unanswerable argument for the use of food of only healthy animals, slaughtered and processed in sanitary surroundings and under hygenic conditions.

Discussions on the effect of curing ingredients and smoke on bacteria in meat, food spoilage, and food poisoning are of especial interest to food inspection and sanitarians.

Generous references are given as foot notes for those interested in further pursuit of specific matters.

THE ANATOMY OF THE BOVINE FOOT by *Robert F. Way*, V.M.D., M.S., assistant professor of anatomy, University of Pennsylvania, School of Veterinary Medicine. 58 pages, 28 full page illustrations by the author. University of Pennsylvania Press, Philadelphia, 1954.—Price $4.

This book is concerned primarily with the distal metacarpal and metatarsal and phalangeal regions of the ox which is of major practical importance to veterinary practitioners.

Beautifully executed plates (drawings by the author) illustrate anatomical structures and their relationships. Each plate is accompanied by pertinent observation, not lengthy descriptions, which directs the reader's attention to important structures and areas. It is valuable contribution and is recommended for all those who practice bovine medicine and surgery.

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BRITISH VETERINARY CODEX, prepared by the Council of the Pharmaceutical Society of Great Britain, 737 pages. The Pharmaceutical Press, publishers, London, 1953.—Price 45 S. (plus postage), approx. $7.

The book has been prepared to supply standards for the numerous substances and preparations used in the prophylaxis and treatment of animal diseases and to give authoritative information on their action and uses.

The treatment of a wide variety of animals is examined and details are provided of appropriate doses found effective in all domestic livestock and pets. The book also contains over 300 formulae, a therapeutic and pharmacological index, many useful tables, and a comprehensive general index.

Generally, monographs considering drugs are listed under generic names. Discussions under each deal with action and uses, toxicity, dose, and preparations. One or more preparations are listed and readers referred to Part III, Formulary. Listed are prescriptions giving quantities expressed in both the metric and imperial systems.